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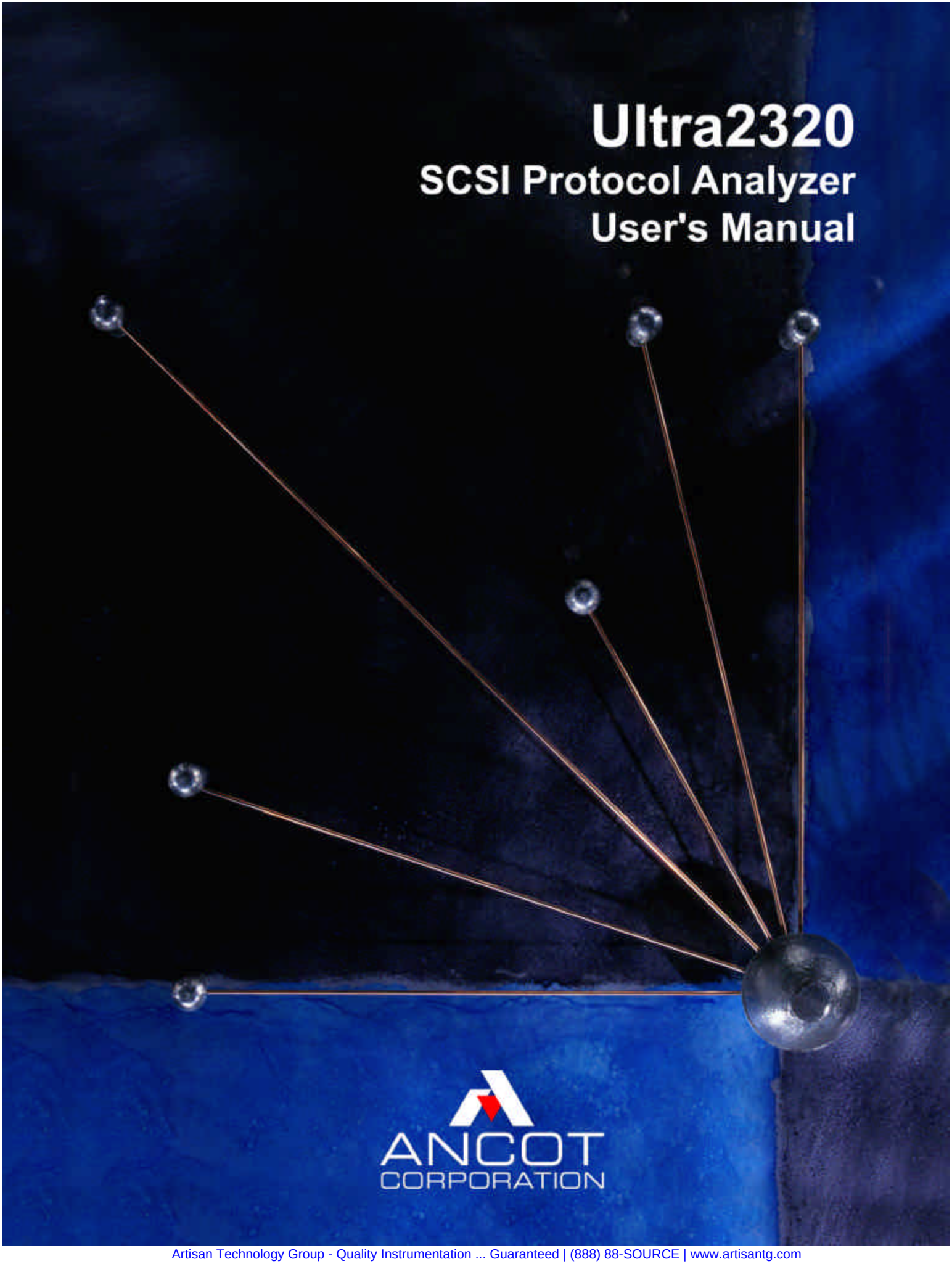
Ultra2320
SCSI Protocol Analyzer
User's Manual



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Ultra2320

SCSI Protocol Analyzer

User's Manual

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SECTION 1

INTRODUCTION

1.1 OVERVIEW

The Ancot Ultra2320 SCSI analyzer captures SCSI events at speeds up to Ultra320 (320 MB/sec). Ancot combines powerful and reliable hardware with Windows-based software for analyzer control. Hardware-based SCSI event detectors guide a high-speed state machine through a user-defined triggering sequence. Filtering strategies allow selective data capture, conserving trace buffer space.

The analyzer is supplied in one of four configurations:

1. a PCI Card to be installed in a host PC,
2. packaged in a Notebook Companion (which plugs into a PCMCIA port on the host PC),
3. already installed in a minitower, or
4. already installed in a portable "Lunchbox" computer.

In each case, the host PC provides networking capability via an Ethernet host interface connection.

1.2 SYSTEM DESCRIPTION

1.2.1 Ultra2320 Hardware

Hardware features of the Ultra2320 Analyzer include the following:

- 320 MB/sec trace analysis
- 2-ns time stamp resolution on REQ and ACK
- data capture on both edges of REQ or ACK
- real-time data filtering
- 4, 8, or 16 MEvent trace buffer
- single connector automatically senses and configures the Ultra2320 Analyzer for single-ended (SE), low voltage differential (LVD), or high voltage differential (HVD) SCSI bus
- SCSI detectors for complex triggering
- external pod for up to four transistor-transistor logic (TTL) input signals and one SYNC output (optional part number U2320/EXT)
- data phase counters
- dynamic single transition (ST) or double transition (DT) data capture

The Ultra2320 Analyzer module acts as a passive third-party observer during analysis operations. Ancot's single-connector design allows automatic configuration for SE, LVD, or HVD interfaces. Captured data is stored as an event record in the circular high-speed RAM trace buffer. A captured event record consists of all SCSI bus signals, external TTL signals, time stamp, positive and negative edge latched data, and a number of flags.

The data out direction (initiator-to-target) uses the ACK signal to capture data, and the data in direction (target-to-initiator) uses the REQ signal to capture data. Data is captured on both edges

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of REQ or ACK. Software displays the data according to the selected view mode. If the data is captured during a ST (Single Transition) data phase, the data is captured on the leading edge of REQ or ACK.

The Ultra2320 Analyzer has 17 SCSI event detectors that guide state machine execution based on your specifications in the trigger and filter definitions. The detectors are implemented in hardware and react in real time to SCSI bus activity.

At any time during execution, the state machine can cause the Ultra2320 Analyzer to trigger. Once triggered, the analyzer will halt capture either immediately or after a specified number of additional events are stored into the trace buffer. Triggering is specified by using one or more SCSI detectors to detect the desired bus state. By using multiple SCSI detectors, complex triggers can be specified.

The Ultra2320 Analyzer also has two counters. One counter is used for specifying the trigger position of the analyzer and the other counter is used in data phases where you might not be interested in every byte of data. This counter can be configured to suspend capture after a certain number of data bytes have passed. When the data phase ends, capture resumes.

Each counter has a register that stores its initial value and is generally used as a down counter, counting down from its initial value one count every time the desired event is encountered. The Ultra2320 Analyzer has dedicated hardware data counters for the REQ and ACK pulses to measure the size of the data phases.

1.2.2 Notebook Companion

The Notebook Companion is a portable chassis designed around the PCI board form factor. A standard PCMCIA port allows easy connection to a host PC, allowing an inexpensive notebook computer to host the test equipment. The networking capabilities of the host PC provide access to it from anywhere on the network.

1.2.3 Software

The Ultra2320 software uses a Windows-based interface. Menus and dialog boxes guide you through setup, trigger and filter configuration, analyzer operation, and trace analysis. Four trace views are available for displaying captured data: raw dump, structured, binary, and compact. Refer to Trace Views in Section 4 - Trace View Data for more information on a specific view.

1.2.4 Online Help

Help in the interactive menu is readily available. Help buttons provide information instantly on specific dialog boxes. Both help topics on procedures and reference information, and the online reference manual can be accessed through the Help pulldown menu.

Online help is always the most up-to-date source of information on the current software version.

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SECTION 2

INSTALLATION

> If you have purchased a prepackaged system (such as the minitower PC or the portable lunchbox PC), then the hardware and software are already installed in your system. See Section 2.5 for SCSI bus connections and then skip to Section 3.

2.1 SYSTEM REQUIREMENTS

Before installing the analyzer PCI card, be sure your system has the following:

- Microsoft Windows 95 or higher, Windows NT 4.0 or Windows 2000
- Available standard 32-bit/33-MHz PCI slot
- Intel Pentium III 500 MHz processor or faster
- 128 MB RAM (recommended)
- 20 MB available hard disk space (additional space for saved traces as desired)
- CD-ROM drive
- 10/100 Base-T Ethernet connection (for network access)

For optimum display of Ultra2320 software, Ancot recommends the following display setting in the Windows Control Panel:

- 800 x 600 minimum screen resolution (1024 x 768 recommended)

2.2 HARDWARE INSTALLATION

The analyzer is a short PCI card (8.25" long) which is supplied in one of four configurations: (1) as a stand-alone board (with software on CD) that can be installed in a host PC; (2) packaged in a Notebook Companion, which connects to the notebook PC via a PCMCIA slot; (3) packaged in a minitower PC, or (4) packaged in a portable "Lunchbox" CPU.

The minitower and lunchbox are "turn-key" configurations, with the Ultra2320 software already installed on the hard drive of the minitower. For the other two configurations, installation of software from the CD(s) supplied will be necessary.

2.2.1 PCI Card Installation

CAUTION

> While working with an open chassis and the analyzer board, be sure to follow electrostatic discharge (ESD) control procedures. Ancot recommends the use of a wrist strap connected to the chassis or preferably to a grounded working surface. Failure to take ESD precautions can result in damage to the analyzer board, the chassis, or both.

Install the Ultra2320 analyzer board into an open PCI slot in the PC chassis.

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2.2.2 Notebook Companion Installation

To use the Notebook Companion version of the Ultra2320, a compatible notebook PC with a Cardbus PCMCIA slot is required. See the Ancot web site at www.ancot.com under the Ultra2320 product section for a list of tested notebook PCs and minimum requirements.

1. Install the Notebook Companion as outlined in Appendix A of is User Manual.
2. Read the remainder of this section regarding using the Notebook Companion, then skip to Section 2.5

Next, whenever you need to use the Ultra2320 Notebook Companion, be sure to adhere to the following power up sequence:

1. Power up the external Notebook Companion by plugging in the external power supply.

2. Power up your notebook computer.

3. When the power up sequence has completed, plug in the PCMCIA card ("Paddle") of the notebook companion into Slot 1 of your notebook computer (usually the upper slot).

4. Start the Ultra2320 software.

2.3 DRIVER INSTALLATION

Install Ultra2320 drivers by doing the following:

1. After installing the analyzer PCI card (if necessary), turn on your computer.

2. Insert the Ultra2320 Software CD into the CD-ROM drive.

3. Continue with one of the following:

   (a) Windows 9x or Windows 2000

   Windows 9x/2000 detects the analyzer PCI card as an unknown PCI board. Follow the onscreen instructions. When prompted for the driver path, enter one of the following:

   For Windows 9x: `d:\drivers\win9x`
   For Windows 2000: `d:\drivers\win2k`

   [in these examples, `d:` is the location of the CD-ROM drive]

   (b) Windows NT

   Windows NT drivers are automatically installed when the Ultra2320 software is installed (Section 2.4 below).

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(c) Windows 2000/XP

NOTE

Be sure you are logged onto Windows 2000/XP with administrator privileges.

- Windows 2000/XP detects the analyzer board as an unknown PCI board. Follow the onscreen instructions. When prompted for the driver path, type:

  `<CD-ROM drive>:\drivers\win2k`

- If Windows 2000/XP does not detect the analyzer board, the driver is installed during software installation.

2.4 SOFTWARE INSTALLATION

Install Ultra2320 software by doing the following:

1. Insert the Ultra2320 Software CD into the CD-ROM drive. Select "Run" from the Windows "Start" menu and type the following, indicating the location of the CD-ROM drive (in this example, `d:` is the CD-ROM drive location):

   `d:/setup`

2. Follow the instructions on the screen to install the software.

If the software ever needs to be removed from your system, Uninstall should be used to remove the software from your system by doing the following:

1. Select Settings from the Windows Start menu and click on Control Panel.

2. Double-click on the Add/Remove Programs icon. Follow the directions in the Add/Remove Programs Properties dialog box to remove the software from your hard drive.

2.5 SCSI BUS CONNECTION

After installing the hardware and software, the system is ready to capture SCSI bus activity.

Make an external connection from the SCSI port on the analyzer board to the SCSI bus under test. The analyzer contains no termination. Ensure that the SCSI bus is properly terminated at each end.

Connect to the SCSI bus using the 68-pin P connector. The hardware detects whether the attached SCSI bus is single-ended (SE), low voltage differential (LVD), or high voltage differential (HVD). The software enables the appropriate receivers. When making the connection, make sure that the cable is plugged with pin 1 oriented up and that the SCSI bus is properly terminated at the two physical ends of the bus.

For more on SCSI bus connections, see www.scsita.org or refer to Ancot's "Basics of SCSI" booklet.

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2.6 TECHNICAL SUPPORT

Ancot offers free technical support for analyzer hardware and software.

NOTES

Before contacting Ancot Technical Support, please confirm that you are using the current software version by selecting About Ultra2320 in the Help pulldown menu, which will identify the software version you are using. Compare that version to the current software version listed on the Ancot Web site at www.ancot.com. Refer to Obtaining Software Updates in this section if you don't have the current software version.

When contacting Ancot Technical Support, please specify the product for which you are requesting support. Ancot Technical Support can be contacted by phone at 650-322-5322, or by email at techsupport@ancot.com.

2.7 SOFTWARE UPDATES

2.7.1 Obtaining Software Updates

Free software updates are available for the life of the product. Software updates can be downloaded from the Ancot web site at www.ancot.com. Simply click on Technical Support and select the Ultra2320 product. If you encounter any problems, contact Ancot Technical Support at 650-322-5322 or techsupport@ancot.com.

2.7.2 Updating the Firmware

Analyzer Board Firmware

Information about your analyzer board can be found in the Current Version dialog box. Select Current Version from the Setup pulldown menu to access this information.

Update the firmware by doing the following:

1. Download updated `.bit` files from the Ancot web site at www.ancot.com.

2. Select Flash SCSI from the Setup pulldown menu in the Ultra2320 interactive menu. The Ultra2320 Flash dialog box appears as shown in Figure 2-1.

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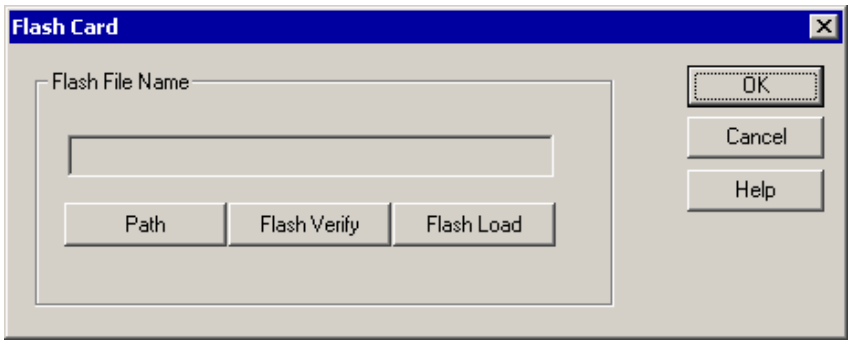

Figure 2-1: Ultra2320 Flash Dialog Box

3. Click on the Path button to locate the flash files. The Open Flash File for Ultra2320 dialog box appears as shown in Figure 2-2.

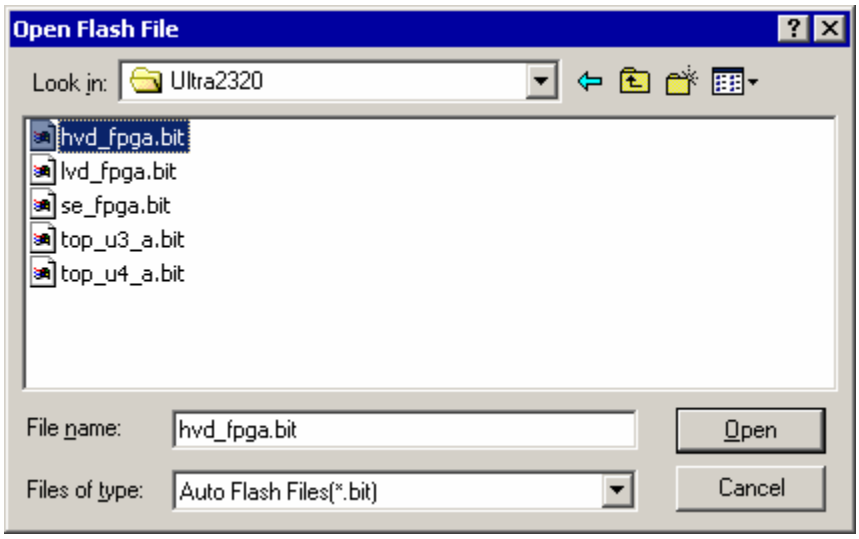

Figure 2-2: Open Flash File for Ultra2320 Dialog Box

4. Select the desired flash file according to the device type, and click on the Open button to return to the Ultra2320 Flash dialog box.

   - `TOP_U4_A.BIT`
   - `HVD_FPGA.BIT`
   - `LVD_FPGA.BIT`
   - `SE_FPGA.BIT`

5. Click on the Flash Load button to load the selected flash file.

6. Click on the Flash Verify button to verify that the flash file matches the analyzer board.

7. Click on the OK button to save the settings. The update process begins automatically.

8. Repeat steps 1-7 to update additional flash files for the Ultra2320 Analyzer.

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2.7.3 Current Version Dialog Box

The Current Version dialog box shown in Figure 2-8 displays the current hardware settings, providing you with information on the installed hardware.

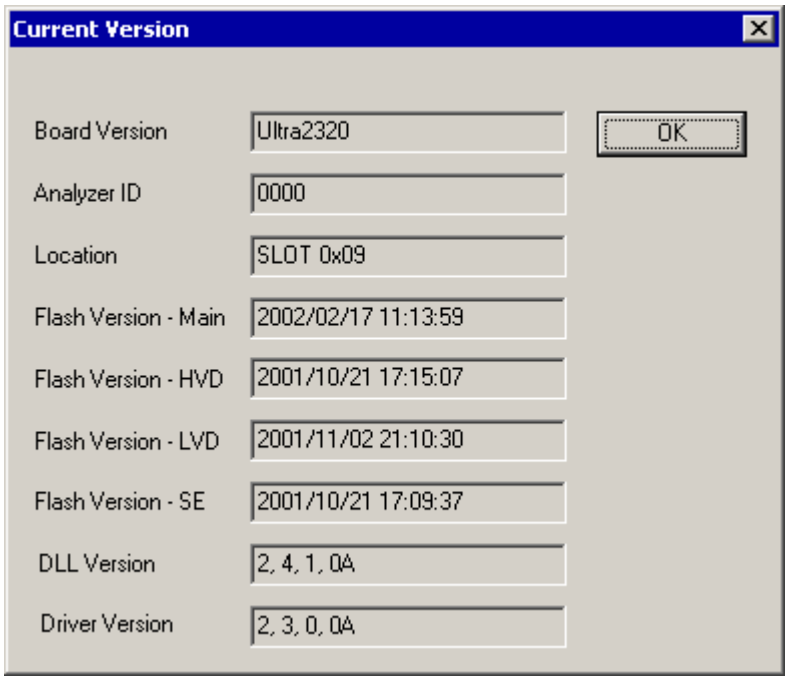

Figure 2-3: Current Version Dialog Box

The Current Version dialog box contains the following fields:

Board Version The device type of the analyzer board (Ultra2320).

Analyzer ID A unique number identifying the analyzer board.

Hardware Mode The location of the analyzer board:
- Analyzer board installed in the host PC (Native).

Flash Version – Main The current version of the main flash file.

Flash Version – HVD The current version of the high voltage differential (HVD) flash file.

Flash Version – LVD The current version of the low voltage differential (LVD) flash file.

Flash Version – SE The current version of the single-ended (SE) flash file.

DLL Version The current version of the DLL file.

Driver Version The current version of the driver.

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SECTION 3

ANALYZER OPERATION

3.1 ONLINE HELP

3.1.1 Required Files for Online Help

The following files are required for online help and are installed in the appropriate places on your system during Ultra2320 software installation:

- U2320.HLP
- U2320.CNT
- SETBROWS.EXE
- ROBOEX32.DLL
- INETWH32.DLL

The U2320.HLP and U2320.CNT files make up the online help system. The SETBROWS.EXE, INETWH32.DLL, and ROBOEX32.DLL files enable you to directly access the Ancot Web site through links within online help to obtain software updates or contact Ancot Technical Support. You must have an installed Web browser with access to the Internet to use these links.

If you have more than one Web browser on your system and want to indicate a specific path for the browser, if you get an error message requesting a browser, or if your browser can't access the Web site, do the following:

1. In the Windows System directory, double-click on SETBROWS.EXE. The WinHelp Internet Access dialog box appears on the screen.

2. Either enter the path and name of the browser or click Browse to find the desired browser and click on the OK button.

3. Click on the OK button to close the WinHelp Internet Access dialog box.

3.1.2 Using Online Help

Online help is available by selecting Help Topics in the Help pulldown menu to display the table of contents and index or by accessing context-sensitive help.

The table in Figure 3-1 indicates how to access a specific type of context-sensitive help.

Online help is always the most up-to-date source of information on the current software version. "Differences Since Last Manual Printing" lists added and revised information since the last manual printing and links you to these topics.

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TOPIC TYPE	TOOL	ACTION
Menu selections	F1 key	Click on specific selection
Tool bar	F1 key	Click anywhere within tool bar
Help file table of contents	F1 key	Click within main menu when a dialog box is not on the screen
Fields in dialog boxes	Question mark cursor (click on ? in upper right corner of dialog box to get this cursor)	Click on specific field
Dialog box	Pointer cursor	Click on Help button

Figure 3-1: Accessing Context-Sensitive Help

Online help is always the most up-to-date source of information on the current software version. "Differences Since Last Manual Printing" lists added and revised information since the last manual printing and links you to these topics.

3.1.3 Changing the Help File Window Size

Ancot online help uses the Explorer View Help structure, which displays the table of contents, index, and search windows to the left of the help topic for easy navigation through the help file. When you need more space to display a topic (for example, to view a program example or function syntax), click on the Help Topics button in the help window to expand the viewing area. Clicking on the Help Topics button again returns the screen to the Explorer View Help structure.

3.2 STARTING THE ANALYZER

Double-click on the Ultra2320 icon to start Ultra2320 software.

3.3 SELECTING AN ANALYZER

When the software is started, the Ancot SCSI Analyzer Selection dialog box shown in Figure 3-2 appears. This dialog box lists the available analyzer boards installed in the host PC.

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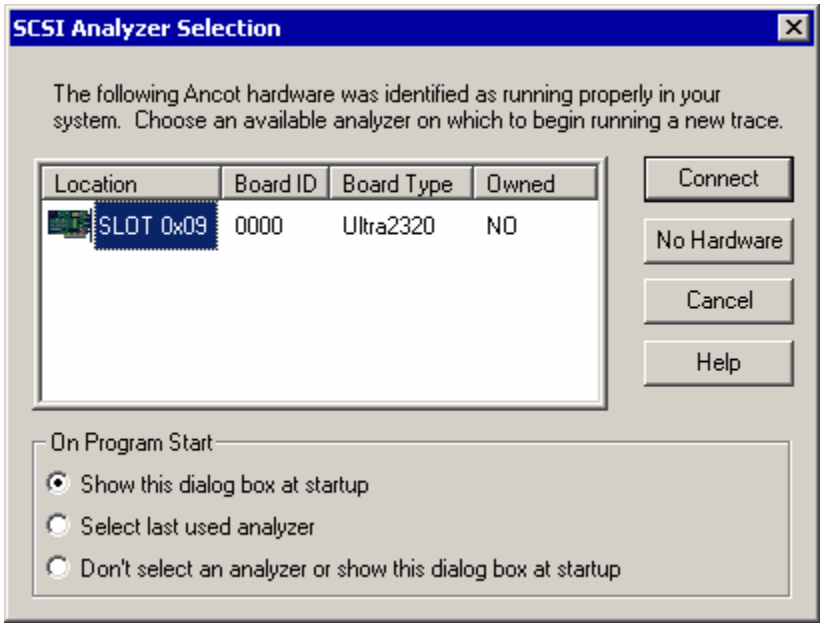

Figure 3-2: Ancot SCSI Analyzer Selection Dialog Box

Select the desired analyzer board as appropriate for your system (Native or No Hardware), and click on the Connect button (once initially selected, the settings will be saved). The initialization process begins automatically. Ultra2320 software can still be used to view previously captured traces or capture strategies if the "No Hardware" button is clicked. You can access the SCSI Analyzer Selection dialog box at any time to change the settings by clicking on the Setup pulldown menu and selecting SCSI Analyzer Selection.

Use the following fields and buttons as desired:

On Program Start

- Select "Show this dialog box at startup" to display the SCSI Analyzer Selection dialog box each time you start the software.
- Select the "Select last used analyzer" radio button to automatically connect to the analyzer previously used with the software. If the hardware is not detected, a message appears on the screen.
- Select "Don't select an analyzer or show this dialog box at startup" when you do not want to connect to an analyzer or when no hardware is installed in your system.

3.4 DISPLAYING THE INTERACTIVE MENU

After starting Ultra2320 software as explained in Starting the Analyzer in this section, the interactive menu appears on the screen as shown in Figure 3-3.

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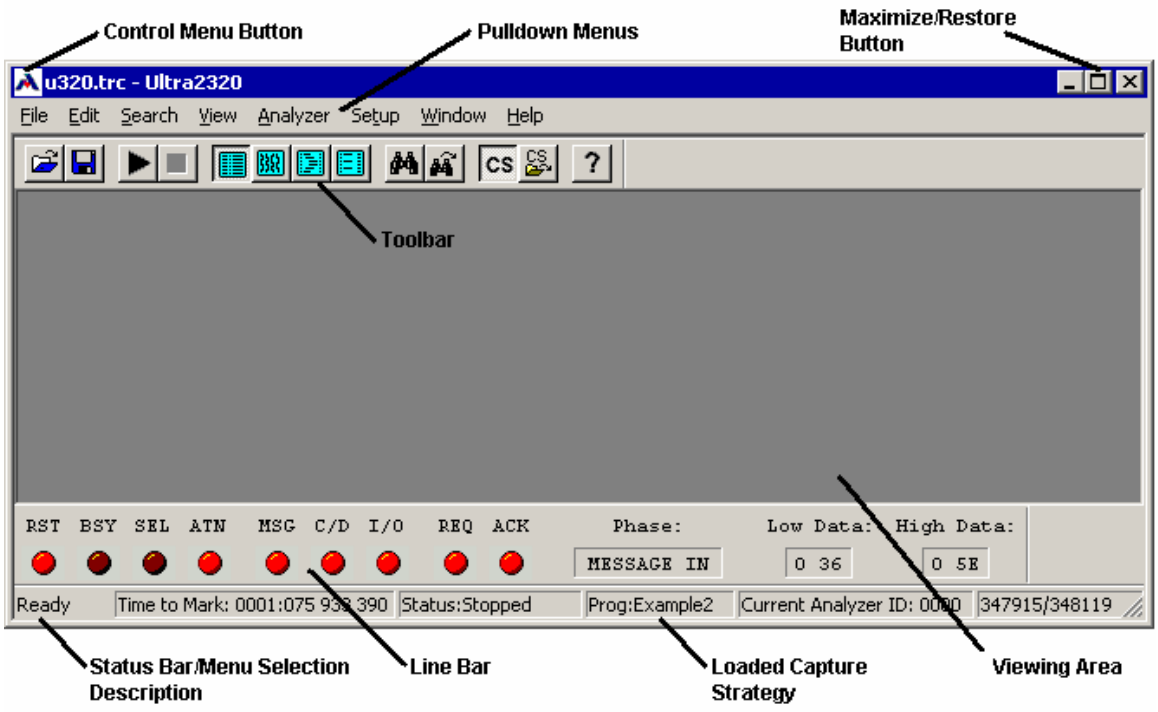

Figure 3-3: Interactive Menu

The menu structure allows you to interactively control the operations of the analyzer.

Refer to Section 6 - Analyzer Software Reference for a description of the pulldown menus and tool bar.

The line bar indicates the state of each SCSI control line in real time when the analyzer is on. It is normally located near the bottom of the screen, but it can be repositioned to attach to any edge of the main window or to float within the main window.

The status bar is located at the bottom of the menu as shown in Figure 3-3 above. Included on this bar are menu selection description, time to mark, status, line mode, buffer fill, loaded capture strategy (Prog), current analyzer ID, and record number. The status of the analyzer is displayed on the status bar as Stopped, Running, TrigHalt, TrigRun, BufWrap, Suspend, or Error. The status bar changes accordingly as the analyzer is running. The Control Menu button, Minimize button, Maximize/Restore button, and Close button are standard Windows functions.

3.5 SETTING THE CDL ASSIGNMENTS

A Command Decode List (CDL) file can be assigned to a bus ID. CDL files are standard text files that can be edited to include decodes for vendor unique commands. A CDL file is used to decode SCSI command operation codes into English in the structured and compact trace views. Different command names are used for a specific operation code depending on the device type. Therefore, the Ultra2320 software provides a CDL file corresponding to each of the device types defined in the SCSI-3 specification and one for the commands common to all device types.

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Command Decode

List File:	For:
ALL-TYPE.CDL	commands common to all device types
CD-ROM.CDL	CD-ROM devices
CHANGER.CDL	medium changer devices
COMM.CDL	communications devices
DISK.CDL	direct access devices
ENCLOSURE.CDL	enclosure services devices
OPTC_CRD.CDL	optical card reader/writer devices
OPTC_MEM.CDL	optical memory devices
PRINTER.CDL	printer devices
PROCESS.CDL	processor devices
SCANNER.CDL	scanner devices
SMPLDSK.CDL	simplified direct-access devices
STOR_ARR.CDL	storage array device
TAPE.CDL	sequential access devices
WORM.CDL	write-once, read-many (WORM) devices

Assign the appropriate CDL to each SCSI ID according to the device type by doing the following:

1. Click on the Setup pulldown menu and select CDL. The CDL Assignment dialog box shown in Figure 3-4 appears on the screen.

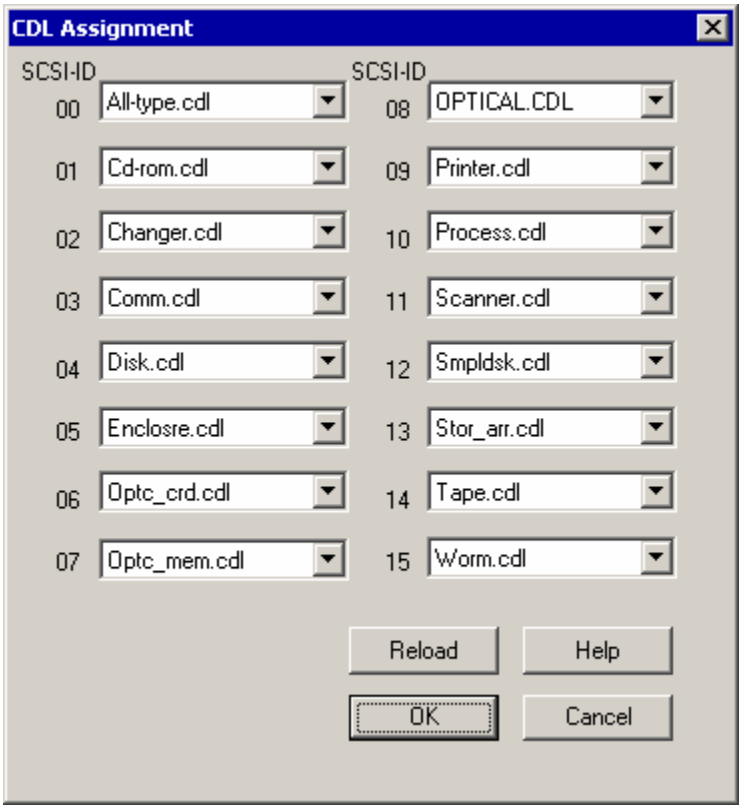

Figure 3-4: CDL Assignment Dialog Box

2. Move to each field and scroll through the list to select the appropriate CDL assignment for the specific ID.

3. Click on the OK button to save your changes.

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NOTE

Clicking on the Reload button updates the CDL lists in the CDL Assignment dialog box as well as the trace views, reflecting the changes made to the CDL file(s).

3.6 ISSUING A SCSI RESET

Ultra2320 software allows you to send a SCSI reset signal over the SCSI bus by selecting "Issue SCSI Reset" in the Analyzer pulldown menu or clicking on the SCSI RST button on the tool bar. By default, a Warning screen will be displayed to ask if you want to continue. You can disable this option by deselecting the Display Reset Warning checkbox in the Warning screen or deselecting the Display Reset Warning selection in the Setup pulldown menu. Click on the "Yes" button to proceed or the "No" button to cancel the action and return to the interactive menu.

3.7 DETERMINING DATA TO CAPTURE

Before starting the analyzer, determine the data to capture. The analyzer software provides two ways for doing this:

- load an existing capture strategy
- create a capture strategy in the Capture Strategy Builder

The Capture Strategy Builder allows you to create complex capture strategies and save them to a .CS file to load into the analyzer immediately and reload in future capture sessions. Previously created strategies can also be modified using the Capture Strategy Builder.

Refer to Section 5 - Capture Strategy Builder for information on creating capture strategies.

3.8 LOADING CAPTURE STRATEGIES

Capture strategies created in the Capture Strategy Builder are saved as .CS files. To select a capture strategy and load it into the analyzer, do the following:

1. Click on Custom Capture from the Setup pulldown menu. The Custom Capture Strategy dialog box appears on the screen.
2. Click on the Load button. The Open Capture Strategy dialog box appears on the screen with a list of .CS files.
3. Select the desired capture strategy (.CS file) so that it appears in the File name field. Figure 3-5 is an example of the Open Capture Strategy dialog box showing a capture strategy selected.
4. Click on the Open button. The capture strategy is loaded into the analyzer and appears in the Custom Capture Strategy dialog box.

NOTE

Only one capture strategy can be open at a time.

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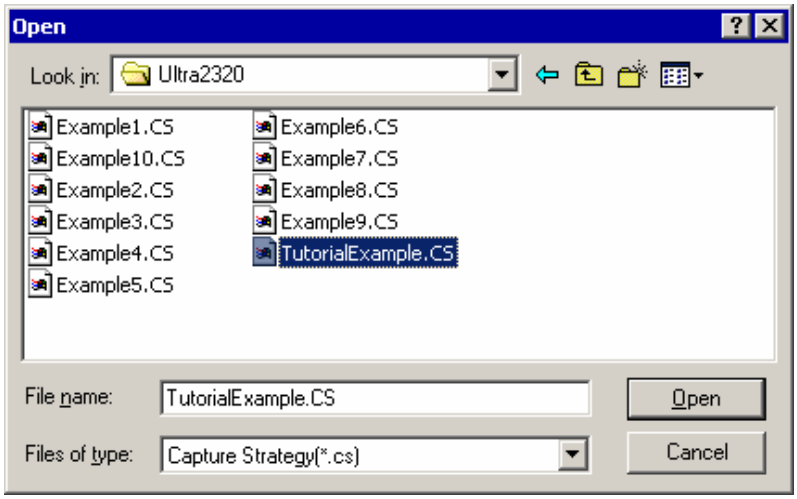

Figure 3-5: Open Capture Strategy Dialog Box

If the desired capture strategy has not yet been created, refer to Creating a Capture Strategy in Section 5 - Capture Strategy Builder to create it. Then load it into the analyzer following the steps 1-4.

3.9 CAPTURING DATA

Capturing data typically involves loading a capture strategy, starting the analyzer, waiting for a SCSI error condition, and displaying the captured data.

1. Load the desired capture strategy as directed in Loading Capture Strategies in this section and click OK. Start the analyzer by clicking on the green Go button from the tool bar or click on the Analyzer pulldown menu and select Start.

NOTE

If the analyzer has not been connected with a cable, the software will display a screen informing you that the start operation was cancelled because the cable was not connected to the analyzer.

2. In a situation where the desired data has not been on the bus, discard the unwanted trace by clicking on the Restart button on the tool bar or selecting Restart from the Analyzer pulldown menu. This enables you to stop and restart the analyzer without having to format and display irrelevant data.

CAUTION

If the line modes (SE, LVD, or HVD) are changed after the analyzer has been started, you will not capture data until you change the line mode back or restart the analyzer.

3. The analyzer will stop capturing data automatically if it is triggered. Follow step 4 to stop the analyzer and format the trace.

4. When the analyzer has captured the desired data, click on one of the view icons on the tool bar. A trace view in the selected format appears on the screen.

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Other ways to view a newly captured trace include stopping the capture strategy by pressing the Stop button on the tool bar, selecting Stop in the Analyzer pulldown menu, right clicking with the mouse and selecting Stop from the Analyzer submenu, or pressing the S key. The New View Format dialog box appears on the screen for selecting a formatted trace view:

- raw dump (each line corresponds to a single captured event)
- structured (data is organized by bus phase)
- binary (data is represented using line drawings)
- compact (each entry summarizes one thread execution of a trace)

Click on a trace view and then on the OK button. The selected trace view appears on the screen.

NOTES

1. Discard a newly captured trace by clicking on the Close button in the upper right corner of the dialog box. Ultra2320 software discards the captured trace and returns to the initial screen of the interactive menu.
2. Unsaved traces that have been accidentally closed can be retrieved by clicking one of the view buttons on the tool bar. The trace will be re-downloaded and formatted into the selected view. Some information may be lost in large traces.
3. Select Cancel Capture from the Analyzer pulldown menu to stop a capture session, discard the captured data, and return to the interactive menu without displaying the formatted trace view.

Refer to Section 4 - Trace View Data for more information on trace views.

3.9.1 New View Format Dialog Box

The New View Format dialog box appears by selecting Stop in the Analyzer pulldown menu, right clicking with the mouse and selecting Stop from the Analyzer submenu, or pressing the S key. Select a formatted trace view (binary, compact, raw dump or structured). Click on a trace view and then on the OK button. The selected trace view appears on the screen.

Selecting the Remember View box defaults the next trace to the same settings used in the last trace view. The New View Format dialog box will not be displayed again until you select Show Views On Start Up in the Setup pulldown menu.

NOTE

Discard a newly captured trace by clicking on the Close button in the upper right corner of the dialog box. Ultra2320 software discards the captured trace and returns to the initial screen of the interactive menu.

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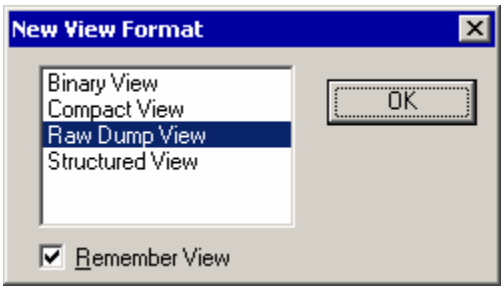

Figure 3-6: New View Format Dialog Box

3.10 EXITING THE SOFTWARE

Click on the File pulldown menu and select Exit. The Ultra2320 software returns you to the Windows work area.

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SECTION 4

TRACE VIEW DATA

4.1 TRACE VIEW CONCEPTS

The following concepts and terms relating to trace views should be understood:

- A "trace" is raw data captured by the analyzer by a capture strategy.
- A "new trace" is recently captured data not yet saved to disk.
- An "old trace" is previously captured data saved to disk in a file with a `.TRC` extension.
- A "trace view" is a formatted trace output as one or more of the following: a raw dump trace view, a structured trace view, a binary trace view, or a compact trace view.
- When more than one view is on the screen, the front-most view is the active view. The title bar in an active view is highlighted. Software functions are performed on the active view only. For example, when multiple views are present on the screen, the search function is performed on only the active view. To make another view active, click on it or select it from the Window pulldown menu, and it will move to the front-most position on the screen. In the Window pulldown menu, the active view is indicated by a checkmark.

4.1.1 Selecting Captured Data to View

To view captured data, do the following:

1. Select one:

   - Previously captured trace -
     Click on the File pulldown menu and select Open. The Open dialog box appears on the screen with a list of saved traces.

   - Newly captured trace -
     With the analyzer running, click on one of the view icons on the tool bar. Skip to step five.

   Other ways to view a newly captured trace include stopping the capture strategy by pressing the Stop button on the tool bar, selecting Stop in the Analyzer pulldown menu, right clicking with the mouse and selecting Stop from the Analyzer submenu, or pressing the S key. Skip to step three.

2. Select the desired trace and click on the Open button.

3. The New View Format dialog box appears on the screen requesting you to select a formatted trace view (raw dump, structured, binary, or compact). Click on a trace view. Select the Remember View box to default the next trace to the same settings used in the current trace view. By selecting this box, the New View Format dialog box will not be displayed again until you select Show Views On Start Up in the Setup pulldown menu.

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4. Click on the OK button.

5. A trace view in the selected format appears on the screen.

NOTES

1. Discard a newly captured trace by clicking on the Close button in the upper right corner of the dialog box. Ultra2320 software discards the captured trace and returns to the initial screen of the interactive menu.

2. Unsaved traces that have been accidentally closed can be retrieved by clicking one of the view buttons on the tool bar. The trace will be re-downloaded and formatted into the selected view. Some information may be lost in large traces.

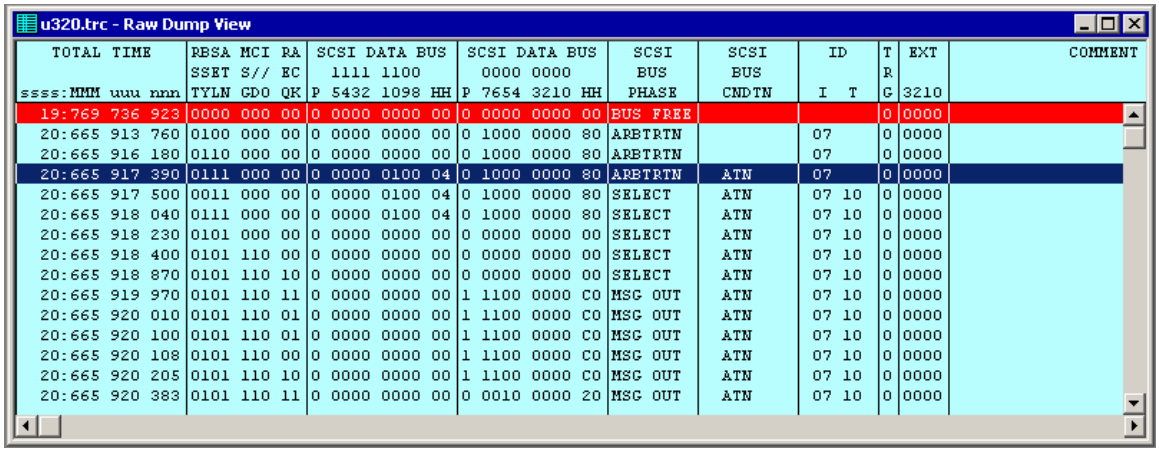
4.2 TRACE VIEWS

The analyzer decodes and organizes captured data into trace view displays for user analysis. Captured data can be displayed in raw dump, structured, binary or compact trace views.

4.2.1 Raw Dump Trace View

The raw dump trace view shown in Figure 4-1 displays the captured data in a format in which each line corresponds to a single captured event. Each SCSI bus signal is represented as 0 (inactive) or 1 (active).

The trace view area of the screen shows the time stamp labeled in seconds, milliseconds, microseconds, and nanoseconds. The view also shows bus phase, bus condition, initiator and target IDs, trigger status, and external bits. If 8-bit mode is selected in the View pulldown menu, the trace view shows only the lower data byte field. If 16-bit mode is selected, the trace view shows both the upper and lower data byte fields. Selecting 8-bit mode in the View pulldown menu collapses the upper data byte field. Click on the upper data byte field to expand it, which will change the setting in the View pulldown menu to 16-bit mode.


u320.trc - Raw Dump View

TOTAL TIME	RBSA MCI RA SSET S// EC	SCSI DATA BUS 1111 1100	SCSI DATA BUS 0000 0000	SCSI BUS PHASE	SCSI BUS CNDTN	ID	T R G	EXT	COMMENT
ssss:MMM uuu nnn	TYLN GDO QK	P 5432 1098 HH	P 7654 3210 HH			I T		3210	
19:769 736 923	0000 000 00	0 0000 0000 00	0 0000 0000 00	BUS FREE			0	0000	
20:665 913 760	0100 000 00	0 0000 0000 00	0 1000 0000 80	ARBTRTN		07	0	0000	
20:665 916 180	0110 000 00	0 0000 0000 00	0 1000 0000 80	ARBTRTN		07	0	0000	
20:665 917 390	0111 000 00	0 0000 0100 04	0 1000 0000 80	ARBTRTN	ATN	07	0	0000	
20:665 917 500	0011 000 00	0 0000 0100 04	0 1000 0000 80	SELECT	ATN	07 10	0	0000	
20:665 918 040	0111 000 00	0 0000 0100 04	0 1000 0000 80	SELECT	ATN	07 10	0	0000	
20:665 918 230	0101 000 00	0 0000 0000 00	0 0000 0000 00	SELECT	ATN	07 10	0	0000	
20:665 918 400	0101 110 00	0 0000 0000 00	0 0000 0000 00	SELECT	ATN	07 10	0	0000	
20:665 918 870	0101 110 10	0 0000 0000 00	0 0000 0000 00	SELECT	ATN	07 10	0	0000	
20:665 919 970	0101 110 11	0 0000 0000 00	1 1100 0000 C0	MSG OUT	ATN	07 10	0	0000	
20:665 920 010	0101 110 01	0 0000 0000 00	1 1100 0000 C0	MSG OUT	ATN	07 10	0	0000	
20:665 920 100	0101 110 01	0 0000 0000 00	1 1100 0000 C0	MSG OUT	ATN	07 10	0	0000	
20:665 920 108	0101 110 00	0 0000 0000 00	1 1100 0000 C0	MSG OUT	ATN	07 10	0	0000	
20:665 920 205	0101 110 10	0 0000 0000 00	1 1100 0000 C0	MSG OUT	ATN	07 10	0	0000	
20:665 920 383	0101 110 11	0 0000 0000 00	0 0010 0000 20	MSG OUT	ATN	07 10	0	0000	

Figure 4-1: Raw Dump Trace View

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4.2.2 Structured Trace View

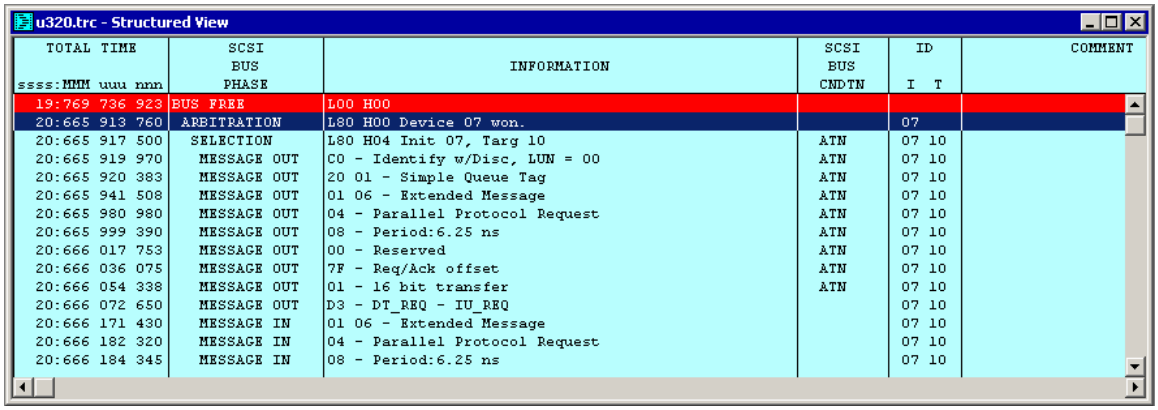
The structured trace view shown in Figure 4-2 displays the captured data organized by SCSI bus phase. Note that each line of the trace view may correspond to multiple captured SCSI bus events.

The structured trace view can be viewed in 8-bit or 16-bit mode. The trace view area of the screen shows the time stamp labeled in seconds, milliseconds, microseconds, and nanoseconds in the Total Time column. This view also shows bus phase decoded in the SCSI Bus Phase column; high and low bytes indicated in hexadecimal in the Information column; packet type, messages and command bytes decoded in the Phase Decode column; bus condition in the SCSI Bus Cndtn column; and initiator and target IDs in the ID I/T column.

The command operation code is decoded according to the CDL file assigned to a specific SCSI ID. The CDL file is assigned based on the device type. For more information, refer to Setting the CDL Assignments in Section 3 - Analyzer Operation.

NOTE

Be sure that the correct CDL file is assigned to the device type (for example, do not assign `DISK.CDL` to a tape device) or the operation code will be incorrectly decoded.



TOTAL TIME ssss:MMM uuu nnn	SCSI BUS PHASE	INFORMATION	SCSI BUS CNDTN	ID I T	COMMENT
19:769 736 923	BUS FREE	L00 H00			
20:665 913 760	ARBITRATION	L80 H00 Device 07 won.		07	
20:665 917 500	SELECTION	L80 H04 Init 07, Targ 10	ATN	07 10	
20:665 919 970	MESSAGE OUT	C0 - Identify w/Disc, LUN = 00	ATN	07 10	
20:665 920 383	MESSAGE OUT	20 01 - Simple Queue Tag	ATN	07 10	
20:665 941 508	MESSAGE OUT	01 06 - Extended Message	ATN	07 10	
20:665 980 980	MESSAGE OUT	04 - Parallel Protocol Request	ATN	07 10	
20:665 999 390	MESSAGE OUT	08 - Period:6.25 ns	ATN	07 10	
20:666 017 753	MESSAGE OUT	00 - Reserved	ATN	07 10	
20:666 036 075	MESSAGE OUT	7F - Req/Ack offset	ATN	07 10	
20:666 054 338	MESSAGE OUT	01 - 16 bit transfer	ATN	07 10	
20:666 072 650	MESSAGE OUT	D3 - DT_REQ - IU_REQ		07 10	
20:666 171 430	MESSAGE IN	01 06 - Extended Message		07 10	
20:666 182 320	MESSAGE IN	04 - Parallel Protocol Request		07 10	
20:666 184 345	MESSAGE IN	08 - Period:6.25 ns		07 10	

Figure 4-2: Structured Trace View

4.2.3 Binary Trace View

The binary trace view shown in Figure 4-3 uses the same formatted data as the raw dump trace view except that the data is represented using line drawings rather than ones and zeros. The double line indicates an active signal, and the single line indicates an inactive signal.

If the 8-bit mode is selected in the View pulldown menu, the trace view shows only the lower data byte field. If the 16-bit mode is selected, the trace view shows both the upper and lower data byte fields. Selecting the 8-bit mode in the View pulldown menu collapses the upper data byte field. Click on the upper data byte field to expand it, which will change the setting in the View pulldown menu to the 16-bit mode.

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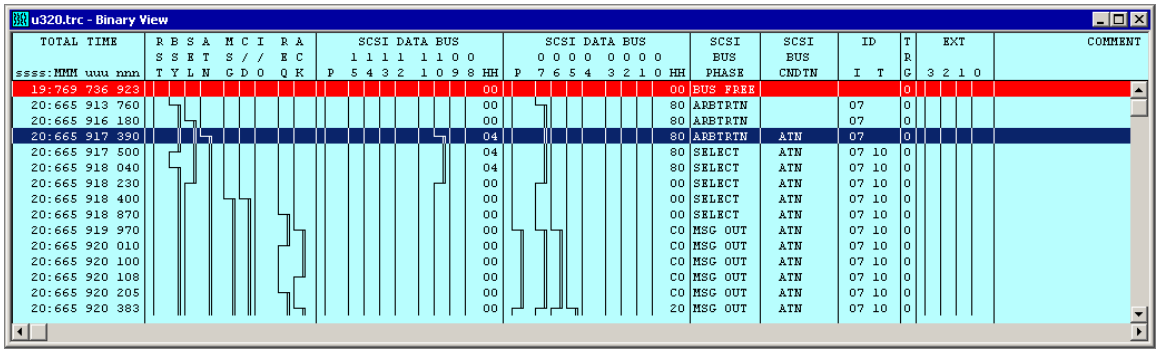

Figure 4-3: Binary Trace View

4.2.4 Compact Trace View

Each entry of the compact trace view shown in Figure 4-4 summarizes one thread execution of a trace. A thread execution is bus activity occurring between two successive bus free conditions, represented by either one or two lines in the trace view. Each thread execution either begins execution of a new command or is a reselection of an already executing command, indicated by a "+" at the far left in the Description field, and ends with either completion of the thread or a disconnection, indicated in the Ending Status field. A status in the Ending Status field indicates a thread execution has completed a thread, and no status in the Ending Status field indicates a disconnection. The operation code field identifies the command operation code for those entries that begin execution of a new command. The raw dump, structured and binary trace views can be used to provide more detailed information on a specific entry in the compact trace view.

The trace view area of the screen shows the time stamp labeled in seconds, milliseconds, microseconds, and nanoseconds. In addition to the fields described above, the trace view shows initiator and target IDs, logical unit numbers, queue tag and message, and the description in English. The description also shows resets, the phase the data was transferred in, and the amount of data transferred in bytes.

The command operation code is decoded according to the CDL file assigned to a specific SCSI ID. The CDL file is assigned based on the device type. For more information, refer to Setting the CDL Assignments in Section 3 - Analyzer Operation.

NOTE

Be sure that the correct CDL file is assigned to the device type (for example, do not assign DISK.CDL to a tape device) or the operation code will be incorrectly decoded.

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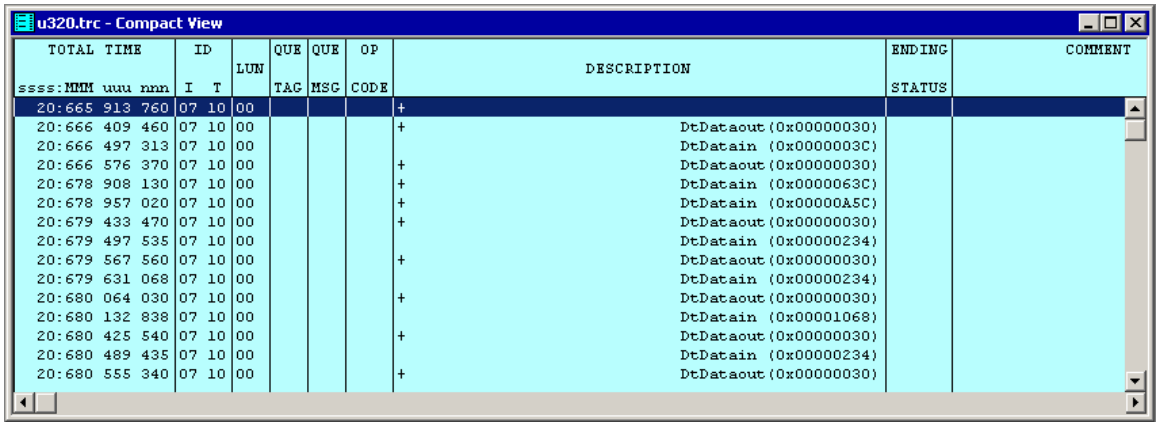

TOTAL TIME ssss:MMM uuu nnn	ID I	ID T	LUN	QUE TAG	QUE MSG	OP CODE	DESCRIPTION	ENDING STATUS	COMMENT
20:665 913 760	07	10	00				+		
20:666 409 460	07	10	00				+ DtDataout(0x00000030)		
20:666 497 313	07	10	00				DtDatain (0x0000003C)		
20:666 576 370	07	10	00				+ DtDataout(0x00000030)		
20:678 908 130	07	10	00				+ DtDatain (0x0000063C)		
20:678 957 020	07	10	00				+ DtDatain (0x00000A5C)		
20:679 433 470	07	10	00				+ DtDataout(0x00000030)		
20:679 497 535	07	10	00				DtDatain (0x00000234)		
20:679 567 560	07	10	00				+ DtDataout(0x00000030)		
20:679 631 068	07	10	00				DtDatain (0x00000234)		
20:680 064 030	07	10	00				+ DtDataout(0x00000030)		
20:680 132 838	07	10	00				DtDatain (0x00001068)		
20:680 425 540	07	10	00				+ DtDataout(0x00000030)		
20:680 489 435	07	10	00				DtDatain (0x00000234)		
20:680 555 340	07	10	00				+ DtDataout(0x00000030)		

Figure 4-4: Compact Trace View

4.3 VIEWING CAPTURED DATA

Select either a previously captured trace (an "old trace" already saved) or a newly captured trace (a "new trace" not yet saved). Four trace views are available for viewing captured data: raw dump, structured, binary and compact. Refer to Trace Views in this section for more information on a specific view.

4.3.1 Trace View Parameters

The following parameters in the View pulldown menu can be changed for a specific view:

- 8-bit or 16-bit mode —

  Each trace view can be configured for 8 or 16 bits. Select the 8-bit mode for a bus that is operating only 8 bits wide. Select the 16-bit mode for a 16-bit-wide bus.

- Time stamp modes — select from the following:

  Total Time – the time stamp associated with each line indicates the elapsed time from the first line in the trace.

  Delta Time – the time stamp associated with a specific line indicates the duration of that line.

  Time to Trigger – the time stamp associated with each line indicates the elapsed time between the line and the line containing the triggering event.

  Time to Mark – the time stamp associated with each line indicates the elapsed time between the line and the marked line.

4.3.2 Viewing Features Common to All Trace Views

- *Scrolling* – click on the vertical or horizontal scroll bar to move to the desired line or to see a hidden part of the trace view.

- *Changing the current line* – the current line of a trace view is highlighted. Use the up and down arrow keys, PgUp and PgDn keys, and Home and End keys to move the cursor to the desired current line.

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- *Bookmarking* – allows you to mark a specific line in an active trace view and easily return to it at any time. See Bookmarking in this section for more information.

- *Marking a line* – click on Mark Line in the Edit pulldown menu or press M to mark the desired line in a trace view. When Time to Mark is also checked in the View pulldown menu, the time difference between the marked and current entries is indicated in the Time to Mark field in the status bar.

- *Resizing/moving trace views on the screen* – to view specific lines or fields of data. Click on the Maximize/Restore button in the upper right corner of the screen to enlarge the viewing area. Click on this button again to return the trace view to its normal size. Trace views can also be resized by clicking the bottom right corner of the viewing area and dragging with the mouse to make the viewing area smaller or larger as desired. Then click anywhere at the bottom of the trace view and drag up or down with the mouse to make the trace view smaller or larger, respectively. Trace views can be moved in the screen area by clicking on the trace view title bar and dragging the trace to the desired location.

- *Collapsing fields* – to make more space on a small screen or for a better view of desired fields. Move the mouse to the header of the field to be collapsed. The cursor changes to the "collapse" cursor. Click on the header, which collapses the field and leaves a double vertical line in its place. Move the cursor to the double vertical line (the cursor changes to the "expand" cursor) and click on the header to return the field to its normal size.

4.3.3 View Colors

Objects in a trace view, such as the selection, a marked line, and a bookmarked line, can be color-coded for ease of viewing.

The default colors assigned to trace view objects can be changed, as desired, by doing the following:

1. In the Setup pulldown menu, select Color Options. The View Colors dialog box shown in Figure 4-5 appears on the screen.

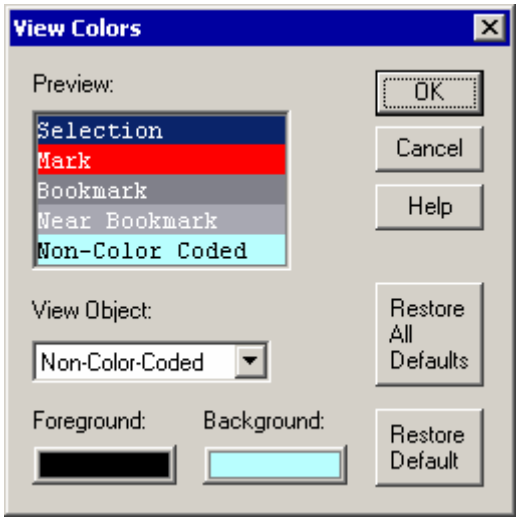

Figure 4-5 View Colors Dialog Box

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2. Click on an object in the Preview pane or scroll through the View Object list to select an object in the trace view to assign a new color:

   Selection ..... The current line.

   Mark ..... A marked line.

   Bookmark ..... A bookmarked line.

   Near Bookmark..... The line with the time stamp closest to that in the bookmarked line when another view of the same trace is displayed on the screen.

   Non-Color-Coded ..... An object that has not been assigned a default color, such as the time column.

3. Click on the color button for either Foreground (to change the text color) or Background (to change the background color). The Color dialog box appears on the screen.

4. Select the desired color in the Color dialog box, and click on the OK button. The Preview pane displays the object in the selected color.

   You can return all objects to their default color settings by clicking on the Restore All Defaults button or the selected object to its default color setting by clicking on the Restore Default button.

5. Click on the OK button to close the dialog box. If a trace view was on the screen during the editing session, it displays the new colors.

4.3.4 Changing to a Different View of the Same Trace

When a trace view is visible on the screen, you can replace that view with another of the same trace. Select the desired trace view by clicking on the icon in the tool bar as shown in Figure 4-6, clicking on the View pulldown menu and select the desired trace view, or by right clicking with the mouse and selecting the desired trace view from the Change View submenu. The previous trace view is replaced with the newly selected trace view. For example, you can choose to replace the raw dump trace view that is currently on the screen with the structured trace view by clicking on the structured trace view icon.

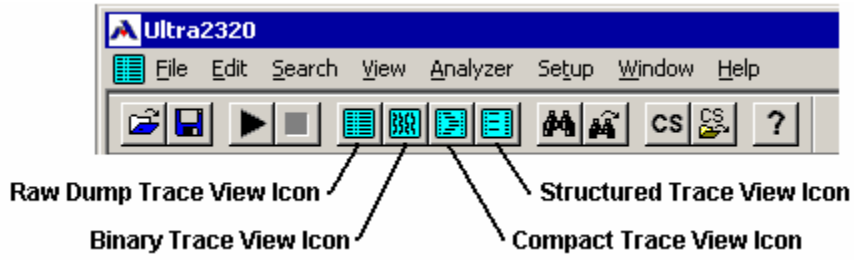
Ultra2320
File Edit Search View Analyzer Setup Window Help
Raw Dump Trace View Icon
Binary Trace View Icon
Structured Trace View Icon
Compact Trace View Icon

Figure 4-6: Tool Bar Showing the Trace View Icons

4.3.5 Opening Multiple Views of the Same Trace

When a trace view is visible on the screen, other views of the trace can also be displayed at the same time. Click on the Window pulldown menu and select a new view of the current trace. The selected view appears on the screen in front of the first view. All four views can be displayed on

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the screen at the same time. Refer to Managing Multiple Views in this section for information on how to easily work with more than one view on the screen.

Opening multiple views of the same trace enables you to view the same information on a variety of levels. For example, a raw dump trace view and a compact trace view displayed on the screen will provide detailed information on a SCSI event from the raw dump trace view and a summary of that same information from the compact trace view.

4.3.6 Opening Multiple Traces

When a trace view is visible on the screen from either a previously captured trace or a newly captured trace, views from other traces can also be displayed. Click on the File pulldown menu and select Open. A directory of trace files appears on the screen. Select the desired trace and click on the Open button. The New View Format dialog box appears on the screen. Select the desired view. The view of the newly selected trace appears on the screen. More views of the selected traces can be opened. Opening multiple traces enables you to compare the same view of different traces.

NOTE

When views of multiple traces are displayed on the screen, make the desired trace active by clicking on it to bring it forward before selecting another view of it.

4.3.7 Managing Multiple Views

- To see multiple views of the same trace or multiple traces at once on the screen, click on the Window pulldown menu and select "Tile". All trace views are positioned so that they are equally visible on the screen.
- To overlap multiple trace views on the screen, click on the Window pulldown menu and select "Cascade".
- The current line in the active trace view is also the current line in all other views of the same trace.

4.4 TRAINING

Training information indicates imbalances found in the SCSI bus (signal skew) and displays the signal corrections that were added to compensate for signal loss. This information is available only when viewing a trace that has been captured with an Ultra2320 Analyzer. The Training Information dialog box, shown in Figure 4-7, retrieves training information for the currently open trace. Click on Training Information in the View pulldown menu to display it. The data is presented by SCSI ID number. The values include data bit (DB), parity low (PTYL) value, and parity high (PTYH) value. Each DB value indicates the delay difference in nanoseconds that was applied to each bit.

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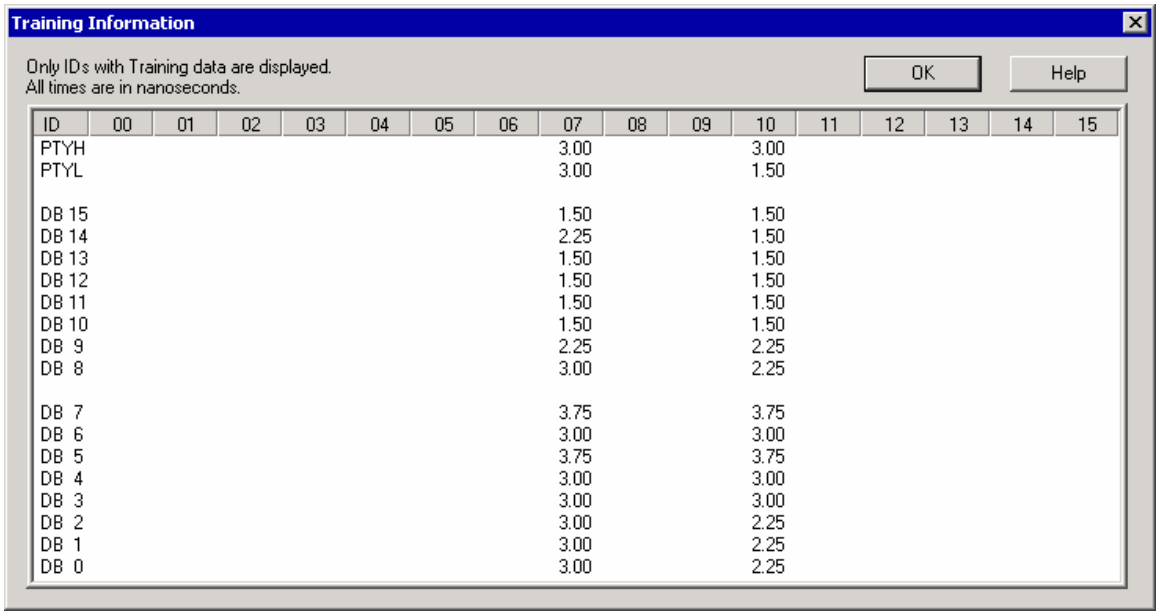
NOTES

1. The PTYL value is valid only for SCSI targets because the initiator does not train this bit.

2. Typical values are between 1.5 and 4.5 ns. However, these values reflect internal timing and should only be examined in relation to the other values. Data bits 0-7 and the parity low value should be fairly similar and not deviate more than approximately 1.5 ns. Data bits 8-15 and the parity high value should also be similar and not deviate more than approximately 1.5 ns.



ID	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
PTYH								3.00			3.00					
PTYL								3.00			1.50					
DB 15								1.50			1.50					
DB 14								2.25			1.50					
DB 13								1.50			1.50					
DB 12								1.50			1.50					
DB 11								1.50			1.50					
DB 10								1.50			1.50					
DB 9								2.25			2.25					
DB 8								3.00			2.25					
DB 7								3.75			3.75					
DB 6								3.00			3.00					
DB 5								3.75			3.75					
DB 4								3.00			3.00					
DB 3								3.00			3.00					
DB 2								3.00			2.25					
DB 1								3.00			2.25					
DB 0								3.00			2.25					

Figure 4-7: Training Information Dialog Box

4.5 NAVIGATIONAL TOOLS

4.5.1 Bookmarking

Bookmarking allows you to mark a specific line in an active trace view and easily return to it at any time.

Add a Bookmark

Add a bookmark to an active trace view by doing the following:

1. Select the line in the trace view in which to place the bookmark.

2. Select one of the options to add a bookmark:

   - Press B.

   - Click with the right mouse button in the active trace view and select Add Bookmark in the Bookmarks submenu.

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- Select Add Bookmark from the Bookmarks submenu in the Edit pulldown menu.
- Double-click on the selected line. The cursor appears in the Edit Bookmark comment field. Enter descriptive information about the bookmark in this field. See Edit a Bookmark in this section to add or modify a comment.

A bookmarked line in a trace view is dark grey. In another view of the same trace, the line with the time stamp closest to that in the bookmarked line is light grey.

NOTE

Bookmarks are shared between different views of the same trace.

Edit a Bookmark

Edit a bookmark by doing the following:

1. Select one of the options to display the Bookmark List dialog box shown in Figure 4-8.
   - Press Ctrl B.
   - Click with the right mouse button in the active trace view and select Bookmark List in the Bookmarks submenu.
   - In the Edit pulldown menu, select Bookmark List in the Bookmarks submenu.
   - Double-click on the selected bookmark. The cursor appears in the Edit Bookmark comment field. Modify the information in this field as desired. Go to step four. Each bookmark assigned to the active trace is listed in the Bookmark List dialog box.

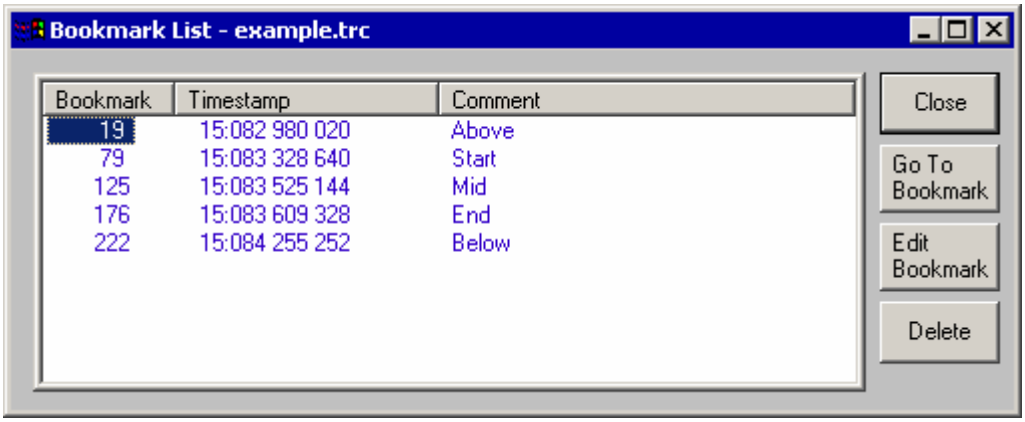

Figure 4-8: List Dialog Box

2. Select the desired bookmark.
3. Click on the Edit Bookmark button or double-click on the desired comment to display the Edit Bookmark comment field and modify the description of the bookmark.

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NOTE

Comments longer than the Comment field display … at the end of the line, and comments with multiple lines display the * character at the beginning of the line. The rest of the comment can be viewed by double-clicking on the bookmark in the active trace view.

4. Click on the Close button to close the Bookmark List dialog box and save your changes.

Delete a Bookmark

Delete a bookmark by doing the following:

1. Move to the line containing the bookmark in the active trace view.

2. Click on that line with the right mouse button and select "Delete Bookmark" in the Bookmarks submenu or select "Delete Bookmark" from the Bookmarks submenu in the Edit pulldown menu.

Delete a bookmark from the Bookmark List by doing the following:

1. Click with the right mouse button in the active trace view and select 'Bookmark List' in the Bookmarks submenu. The Bookmark List dialog box appears on the screen. Each bookmark assigned to the active trace view is listed in the Bookmark List dialog box.

2. Click on the desired bookmark to delete in the Bookmark field.

3. Press the Delete button to delete the bookmark from the current line.

4. Click on the Close button to close the Bookmark List dialog box and save your changes.

Go to a Bookmark

1. Click with the right mouse button in the active trace view and select "Bookmark List" in the Bookmarks submenu, or select "Bookmark List" from the Bookmarks submenu in the Edit pulldown menu.

2. The Bookmark List dialog box appears on the screen.

3. Select the desired bookmark in the list.

4. Click on the Go to Bookmark button or double-click on the desired bookmark number in the Bookmark List dialog box. The bookmarked line moves to the top of the trace view window.

5. Click on the Close button to close the Bookmark List dialog box or press the Minimize button in the upper right corner of the dialog box to keep it available.

4.5.2 Marking a Line

When you mark a line in the active trace view, Ultra2320 software calculates the elapsed time between the marked line and the current line and indicates it (in seconds, milliseconds, microseconds, and nanoseconds) in the status bar at the bottom of the window as "Time to Mark". When the current line is before a marked line, the time appears as a negative value, and when it is after a marked line, it appears as a positive value.

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To mark a line, select the desired line in the active trace view, and press M or select "Mark Line" in the Edit pulldown menu. The default color for a marked line is red. Marking another line in the trace view replaces the previously marked line. Closing the trace view removes the marked line.

4.6 SEARCHING A TRACE VIEW

Ultra2320 software enables you to search either backward or forward through a raw dump, structured, compact or binary trace view for the next entry that matches the search mask.

To initiate a search:

1. The desired trace view should be visible on the screen. If you have more than one trace view on the screen, make the trace view to be searched the active trace view by clicking on it to bring it forward.

2. In the Search pulldown menu, click on the "Find" selection or the Find icon on the tool bar. The Search Mask Editor dialog box shown in Figure 4-9 appears on the screen for the raw dump, structured and binary trace views. The Search Mask Editor dialog box shown in Figure 4-10 appears on the screen for the compact trace view.

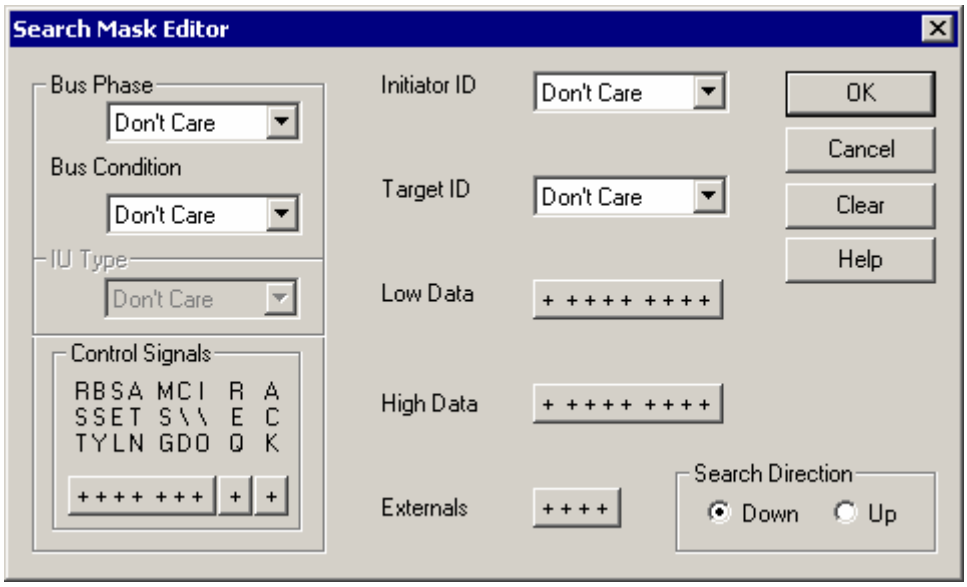

Figure 4-9: Search Mask Editor Dialog Box for Raw Dump, Structured and Binary Trace Views

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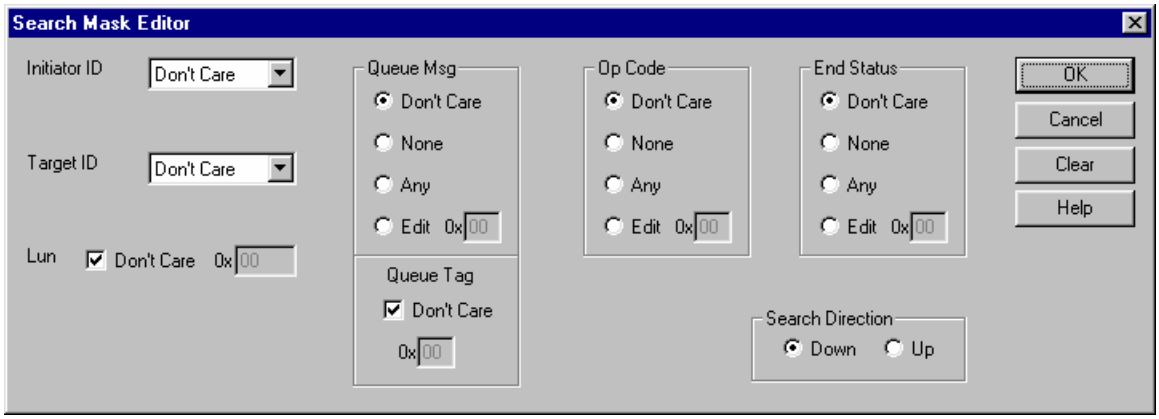

Figure 4-10: Search Mask Editor Dialog Box for the Compact Trace View

3. Specify the parameters of the search. The Search Mask Editor dialog boxes contain the following fields:

Bus Phase Select a bus phase for which to search. The selections in this field include User Define, Bus Free, Arbitration, Selection, Reselection, Data Out, Data In, Command, Status, Message Out, Message In, Double Transition Data Out, and Double Transition Data In.

Bus Condition Select a bus condition for which to search. Available selections for this field include Reset, Triggered, Attention, Parity Error, CRC Error, Glitch, and Don't Care. If this field is not important to the search, select "Don't Care."

IU Type Allows you to search for different packet types. If this field is not important to the search, select "Don't Care." Available selections for this field include L_Q, Last Command, Multi-Command, Status, Data, and Data Stream. This field is only available when viewing a trace in structured view, IU Decoding is selected in the View pulldown menu, and one of the following bus phases is selected: Don't Care, DT Data In, DT Data Out, or CRC.

Initiator ID/Target ID Select an initiator ID and/or a target ID for which to search. If these fields are not important to the search, select "Don't Care."

Custom control areas Allows mask bits for each SCSI signal to be independently controlled. These include Control Signals, Low Data, High Data, and Externals. The following values can be selected for each field: one (indicated by 1), zero (indicated by 0), and "don't care" (indicated by +). Clicking on the buttons will either change the value for a specific bit or display a dialog box for changing values. The Control Signals fields are set by the selections made in the Bus Phase and Bus Condition fields but can be overridden by clicking on the buttons.

The Low Data and High Data fields can be set by clicking on individual buttons or by entering a hexadecimal value in the High Data Bits dialog box and the Low Data Bits dialog box. Custom control areas are available depending on the active trace. For

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example, the phase trace view allows values to be set in the Low Data field only.

Search Direction Specify the direction in which to search in the trace. Selecting down searches forward in the trace. Selecting up searches backward in the trace.

Lun Select a logical unit number (LUN) for which to search. Enter the LUN as a hexadecimal value or select "Don't Care."

SCSI Reset Allows you to search for a SCSI bus reset. If this field is not important to the search, deselect the checkbox.

Queue Msg Allows you to search for a specific message in the queue. If this field is not important to the search, select "Don't Care."

Queue Tag Allows you to search for a specific tag in the queue. If this field is not important to the search, select "Don't Care."

Op Code Allows you to search for a specific command operation code. If this field is not important to the search, select "Don't Care."

End Status Allows you to search for a completed thread. If this field is not important to the search, select "Don't Care."

Reset the Search Mask Editor dialog box to the default settings by clicking on the Clear button.

4. Click the OK button to close the Search Mask Editor dialog box and initiate the search in the active trace view. The cursor moves to the first line that matches the search mask.

   To continue the search, click on Find Next in the Search pulldown menu or on the Find Next icon in the tool bar.

   Click on the Cancel button to stop the search.

NOTE

Specify a search mask that the analyzer can match. The software will search the trace view for whatever specifications are set in the Search Mask Editor dialog box. If a match is not found, the cursor remains on the line where the search was initiated.

4.7 FINDING A TRIGGER

Find a trigger by doing the following:

- Click with the right mouse button in the active trace view and select "Go to Trigger" from the Search submenu, or select "Go to Trigger" from the Search pulldown menu. If a trigger is found, the cursor moves to the record containing the first trigger. If no triggers are found, the cursor remains on the line where the search was initiated.

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4.8 SAVING TRACE DATA

When a newly captured trace has been formatted, any action performed that might cause the trace to be discarded (such as closing the last view, closing Ultra2320 software, or starting the analyzer) displays a prompt to remind you to save the trace. To discard the trace, click on No in the Analyzer Windows Application prompt. To save the trace, click on Yes. The Save As dialog box shown in Figure 4-10 appears on the screen. Indicate the directory in which to save the trace (if different from the default) and the file name. Leave the file type at the default setting. Click on the Save button.

You can also choose to save the trace by selecting Save or Save As in the File pulldown menu when a trace is on the screen and enter the necessary information in the Save As dialog box.

To save an active trace view, do the following:

1. Select "Save As" in the File pulldown menu. The Save As dialog box appears on the screen as shown in Figure 4-11.

2. Select the range of data to be saved in the From and To fields. The range of data can be a combination of the following:

   - Beginning of Trace to End of Trace – prints the entire trace.
   - Start of Selection – starts or ends the data range at the beginning of the text selected in the trace view. Selecting Start of Selection to End of Selection prints the entire block of selected data in the trace view.
   - End of Selection – starts or ends the data range at the end of the text selected in the trace view.
   - Marked Line – starts or ends the data range at the marked line.
   - Current Line – starts or ends the data range at the current line.
   - Bookmarks – starts or ends the data range at the selected bookmark. Select a bookmark from the list or click on the Show Bookmarks button to display the list of assigned bookmarks by time stamp.

   The file size field indicates the amount of space required on your hard drive to save the selected range of trace data.

3. Enter a file name in the File name field and click on the Save button. The trace is saved as a .TRC file.

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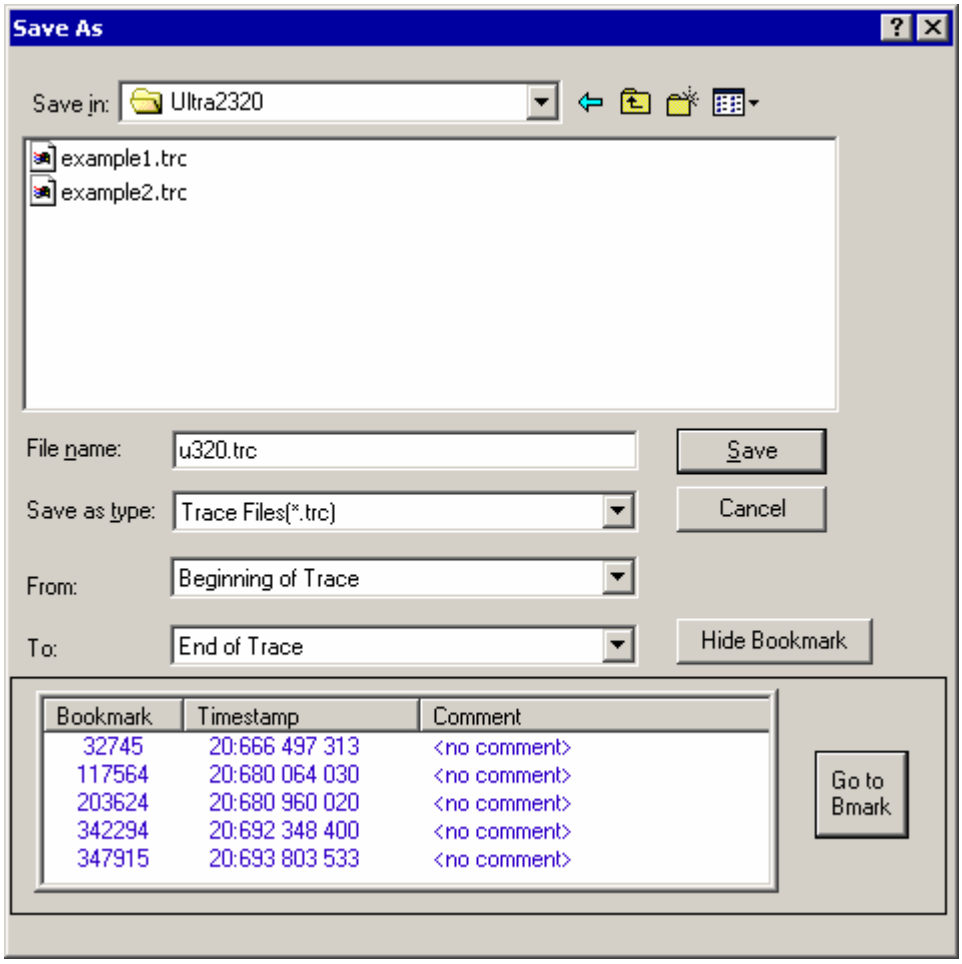

Figure 4-11: Save As Dialog Box

4.9 SAVING TRACE DATA AS A TEXT FILE

Trace data can be saved as a text file to be viewed and formatted using a text editor. Text files can also be viewed in spreadsheet programs, for example Microsoft Excel. To save trace data as a text file, do the following:

1. Display a trace view on the screen.

2. From the File pulldown menu, select Save As Text. The Save As Text dialog box appears on the screen as shown in Figure 4-12.

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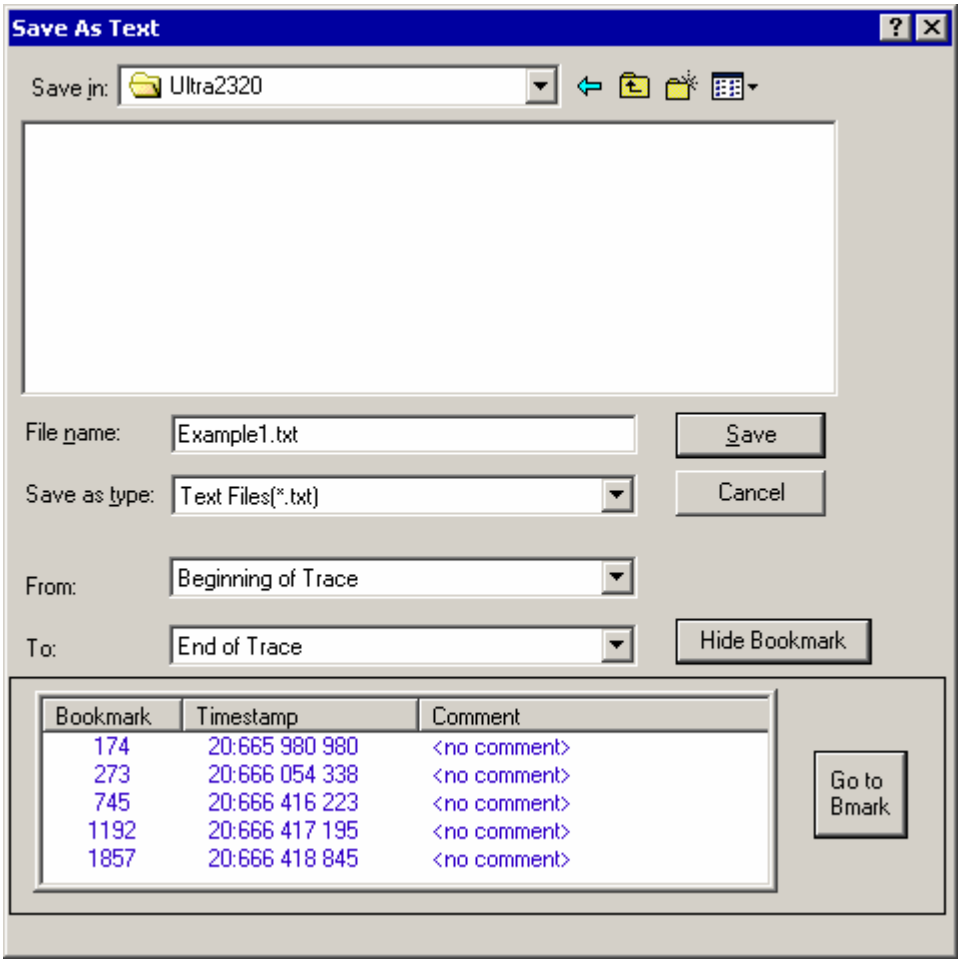

Figure 4-12 Save As Text Dialog Box

3. Select the trace data to save by scrolling through the From and To fields and selecting the desired range. The range of data can be a combination of the following:

   - Beginning of Trace to End of Trace – prints the entire trace.
   - Start of Selection – starts or ends the data range at the beginning of the text selected in the trace view. Selecting Start of Selection to End of Selection prints the entire block of selected data in the trace view.
   - End of Selection – starts or ends the data range at the end of the text selected in the trace view.
   - Marked Line – starts or ends the data range at the marked line.
   - Current Line – starts or ends the data range at the current line.

   - Bookmarks – starts or ends the data range at the selected bookmark. Select a bookmark from the list or click on the Show Bookmarks button to display the list of assigned bookmarks by time stamp.

4. Highlight a bookmarked line in the trace view by double clicking on the desired bookmark or by selecting the bookmark in the bookmark list view at the bottom of the dialog box and clicking on the Go to Bmark button.

5. Type a file name in the File name field and click on the Save button. The trace is saved as a .TXT file.

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NOTE

Larger amounts of trace data will slow down the saving process. Click the "Cancel" button on the progress bar to stop the saving process.

4.10 DELETING TRACE DATA

Delete a trace by doing the following:

1. Click on "Open" in the File pulldown menu. The Open dialog box appears on the screen.
2. Click with the right mouse button on the trace to be deleted.
3. Click on "Delete" from the Windows shortcut menu. The Confirm File Delete dialog box appears on the screen.
4. Click on "Yes" to delete the trace.
5. Click on the Cancel button to close the Open dialog box.

4.11 PRINTING A TRACE

Ultra2320 software allows you to print a trace view — either all of the view or a selected part of it. To print an active trace view, do the following:

1. Select "Print" in the File pulldown menu. The Page Setup dialog box appears on the screen as shown in Figure 4-13.
2. Select the range of data to be printed in the Print Range section. The range of data can be a combination of the following:
   - Beginning of Trace to End of Trace – prints the entire trace.
   - Start of Selection – starts or ends the data range at the beginning of the text selected in the trace view. Selecting Start of Selection to End of Selection prints the entire block of selected data in the trace view.
   - End of Selection – starts or ends the data range at the end of the text selected in the trace view.
   - Marked Line – starts or ends the data range at the marked line.
   - Current Line – starts or ends the data range at the current line.
   - Bookmarks – starts or ends the data range at the selected bookmark. Select a bookmark from the list or click on the Show Bookmarks button to display the list of assigned bookmarks by time stamp.
3. Click on the "Print" button to close the dialog box and send the trace view data to the printer.

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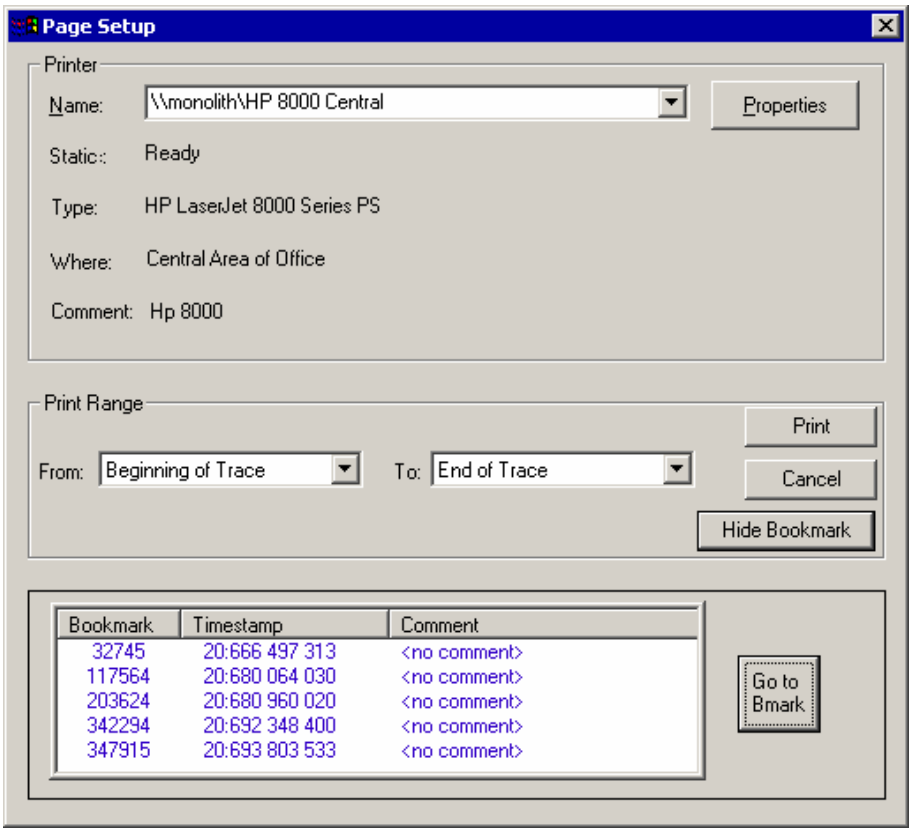

Figure 4-13: Page Setup Dialog Box

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SECTION 5

CAPTURE STRATEGY BUILDER

5.1 OVERVIEW

The Capture Strategy Builder is a tool for creating a complex capture strategy through the configuration of strategy blocks for real-time data capture and triggering by the analyzer. The strategy blocks are a representation of how the underlying hardware is configured. Each block in a capture strategy represents a single state machine control block. A capture strategy can have up to 16 strategy blocks. Seventeen SCSI event detectors are available for use by a strategy. At any time during data capture, only one block within a strategy is active.

A hardware block is capable of doing the following:

- performing tests using up to two SCSI event detectors
- depending on the outcome of a test, performing a task as it transfers control to a subsequent block

The Capture Strategy Builder is designed for ease of use and combines the block configuration process into a single dialog box for creating complex capture strategies. When setting the parameters for a specific strategy block, only the options related to the current configuration are available; no other options are displayed.

The following information is included in this section to assist you in fully understanding the features of the Capture Strategy Builder:

- detailed description of the Capture Strategy Builder dialog box
- directions on loading and modifying existing capture strategies
- a tutorial in which you can navigate, step by step, through the process of creating and editing a capture strategy
- examples of common strategy configurations

5.2 CAPTURE STRATEGY BUILDER DIALOG BOX

The Capture Strategy Builder dialog box shown in Figure 5-1 allows you to create a complex capture strategy through the configuration of strategy blocks for real-time data capture and triggering by the analyzer. Individual program blocks are configured by setting parameters in the Conditional A and Conditional B sections in this dialog box. Make the desired changes, and the values entered appear in the display area under Program Blocks. Refer to the Tutorial in this section for additional information on using the Capture Strategy Builder.

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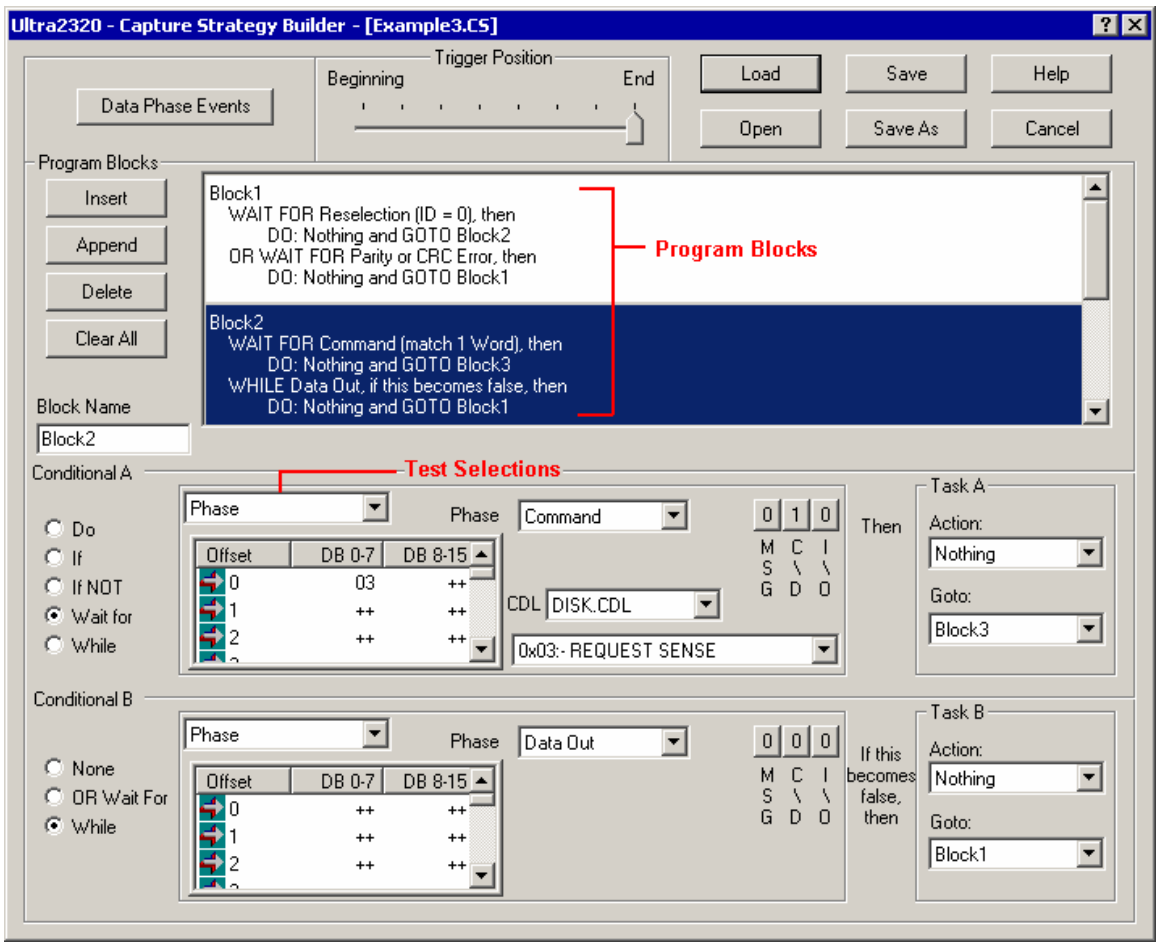

Figure 5-1: Capture Strategy Builder Dialog Box

The Capture Strategy Builder dialog box contains the following fields:

Data Phase Events — Number of transfer cycles (bytes or words) to be captured during data phases. Select either All Data or Parity Mask. Selecting All Data captures all transfer cycles, and selecting Parity Mask conceals high parity errors. To capture a specific number of stores, deselect All Data. From the Data Filtering field, select either 4, 16, 64, or 512 Stores. For example, selecting a value of 16 Stores indicates that 16 stores per data phase are captured.

Insert — Adds a program block before the selected block in the capture strategy.

Append — Adds a program block at the end of the capture strategy.

Delete — Removes the selected block from the sequence in the capture strategy.

Clear All — Removes all of the blocks in the capture strategy.

Trigger Position — Indicates the desired position of the trigger within the trace by allowing the analyzer to capture a specified number of transfer cycles (bytes or words) after the trigger. Data capture can stop immediately after the trigger, after an additional buffer's worth of data, or at some point in

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between. Placing the trigger at the end of the trace is accomplished by having the analyzer hardware stop data capture immediately after the trigger. A trigger position earlier in the trace is accomplished by having the analyzer hardware continue to capture more data after the trigger has occurred. Each segment represents 512 K transfer cycles. The slider can be moved in increments of 512 K transfer cycles. The default trigger position is set to the middle.

Load Loads the capture strategy into the analyzer and closes the Capture Strategy Builder dialog box.

Open Displays the Open Capture Strategy dialog box for opening an existing capture strategy.

Save Displays the Save Capture Strategy dialog box to save a new capture strategy or save over an existing capture strategy.

Save As Displays the Save Capture Strategy dialog box to save a modified capture strategy with a different file name.

Cancel Closes the Capture Strategy Builder dialog box and discards any changes made.

Program Block(s) Builds custom capture strategies, adding and deleting strategy blocks as necessary, through the configuration of parameters in the Conditional A and Conditional B sections.

Block Name A label for the program block consisting of a maximum of eight characters. Type the block name into this field. The label is used in the Goto field of other strategy blocks to refer to this strategy block.

Conditional A/B A test that will be performed by comparing SCSI bus activity to Conditional A and Conditional B. Select from the following possible combinations:

Do ..... Does not do a test; does Task A.

If..... If the test in Conditional A is true, does Task A; if the test in Conditional A is false, does nothing and execution proceeds to the next program block.

If – Else..... If the test in Conditional A is true, does Task A; if the test in Conditional A is false, does Task B.

If NOT ..... If the test in Conditional A is false, does Task A; if the test in Conditional A is true, does nothing and execution proceeds to the next program block.

If NOT – Else ..... If the test in Conditional A is false, does Task A; if the test in Conditional A is true, does Task B.

Wait for – None..... Waits for the test in Conditional A to become true and then does Task A.

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Wait for – OR Wait For . Waits for the test in Conditional A or Conditional B to become true and then does Task A if the test in Conditional A becomes true or does Task B if the test in Conditional B becomes true.

Wait for – While ..... Waits for the test in Conditional A to become true while Conditional B is true; if Conditional A becomes true does Task A, and if Conditional B becomes false does Task B.

While – None ..... Waits until the test in Conditional A is false and then does Task A.

While – AND While ..... Waits until the test in Conditional A or the test in Conditional B is false, and then does Task A if Conditional A becomes false, or does Task B if Conditional B becomes false.

Test Selections

A hardware detector to be used by the strategy block. Select from the following options in the list box:

Arbitration Contention... Causes the analyzer to trigger when arbitration involving more than one device is detected.

Counter ..... Detects when the state machine counter equals the specified value. Capture strategies that use a counter must be reset using the "Reset Counter" selection in the Action drop down menu. See Example 4 in this section for a capture strategy that triggers after 10 read commands.

Extern ..... detects external pod lines and can be setup to trigger on any combination of the external lines.

False ..... Causes the test object to be false.

Parity or CRC Error: ..... Detects a parity or CRC error.

Phase..... Compares specific data in a phase to the expected data value. Phase selections include User Defined, Bus Free, Arbitration, Selection, Reselection, Data Out, Data In, Command, Status, Message Out, Message In, DT Data Out, and DT Data In.

Reset ..... Detects a SCSI bus reset.

Selection Timeout..... Detects a selection timeout.

Timeout..... Sets a value of milliseconds or microseconds after which the detector becomes active.

Training..... Detects training on the bus.

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NOTE

Fields for defining hardware detector parameters depend on the specific hardware detector selected.

Action Tells the strategy what to do if or when the test is successful. Select from the following options in the list box:

Increment Counter..... Increases the count by one.

Nothing ..... Does not perform an action.

Pulse Sync Out..... Creates a pulse to trigger an external device (such as a logic analyzer).

Reset Counter ..... Resets the counter to zero.

Resume Capture ..... Resumes data capture if it has been previously suspended.

Store Immediate ..... Stores data immediately.

Suspend Capture..... Suspends data capture and causes the sample to be stored in the trace buffer.

Trigger ..... Causes data capture to stop immediately after the trigger, after an additional buffer's worth of data capture, or at a point in between, depending on the trigger position.

Goto Directs strategy flow from this block to a designated block if the test is successful and after the action is performed. The Goto selection for Task B is used only if specified in the test. Select from the block labels listed or NEXT BLK.

5.3 CREATING A CAPTURE STRATEGY

This section guides you through the basic steps of creating a capture strategy. Follow the instructions in the Tutorial to configure a sample capture strategy. For more information, refer to the Capture Strategy Builder Dialog Box in this section.

5.3.1 Tutorial

NOTE

In this tutorial, you will create a sample capture strategy. The configuration of this capture strategy is for example only, and the selections are shown in italics. When you create your own capture strategies, configure as appropriate for your specific needs.

The purpose of this capture strategy is for the analyzer to trigger on a check condition status.

1. In the Setup pulldown menu, select Capture Strategy Builder or click on the Capture Strategy Builder button from the tool bar. The Capture Strategy Builder dialog box appears.

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2. Set the following fields as shown in Figure 5-2:

   - Data Phase Events ..... Select Parity Mask, deselect All Data, and select 16 Stores in the Data Filtering field

   - Trigger Position ..... Move slider to End

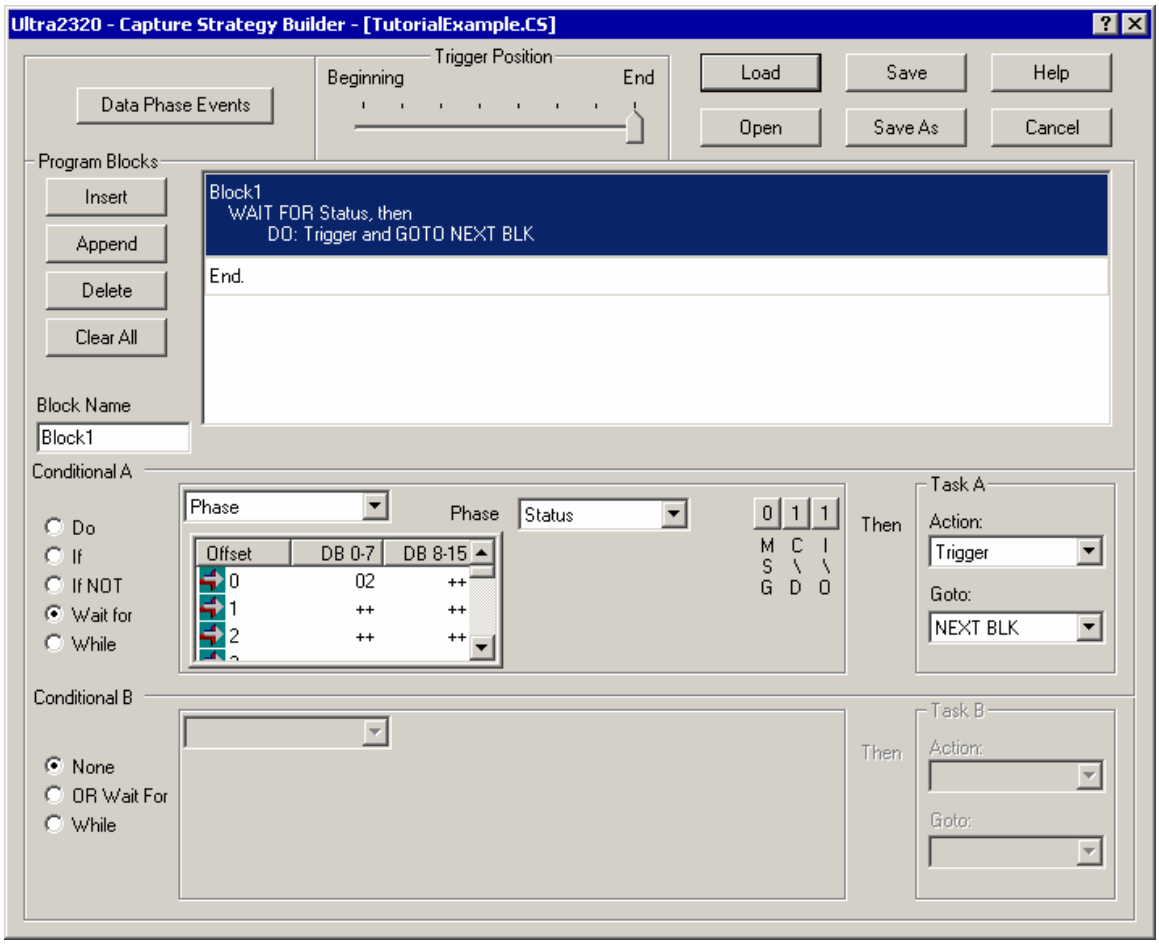

Figure 5-2: Capture Strategy Builder Dialog Box Showing Defined Parameters

3. Click on the Insert button.

4. Make sure Block1 is highlighted in the display area, and set the following fields:

   - Block Name..... Leave as Block1

   - Conditional A..... Select the "Wait For" radio button, select "Phase" from the Test Selection drop down box, select "Status" from the Phase drop down box, and enter "02" for Offset word number 0 in column DB 0-7

   - Action ..... Select "Trigger"

   - Goto ..... Select "NEXT BLK"

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5. Click on the "Save" button. The Save Capture Strategy dialog box appears on the screen. Type "TutorialExample" in the File name field. Click on the "Save" button to save the `TUTORIALEXAMPLE.CS` file.

NOTE

To insert additional blocks into the strategy, click on the Insert button to add a program block after the selected block or click on the Append button to add a program block at the end.

6. Click on the Load button to load the capture strategy into the analyzer and leave the Capture Strategy Builder.

Refer to Tutorial Example in this section to view the entire capture strategy configuration and for a description of what this specific capture strategy will do.

Tutorial Example: Analyzer triggers on a check condition status

Analysis: This capture strategy is designed to trigger when a check condition is found in the trace.

Block 1 waits for a Status of 02, after which the analyzer triggers and execution proceeds to the next block. Refer to the TUTORIALEXAMPLE.CS file included with Ultra2320 software for the actual capture strategy.

5.4 MODIFYING A CAPTURE STRATEGY

1. Click on the Capture Strategy Builder selection from the Setup pulldown menu or click on the Capture Strategy Builder button from the toolbar. The Capture Strategy Builder dialog box (Figure 5-1) appears on the screen.

2. Click on the Open button. The Open Capture Strategy dialog box appears.

3. Select the desired capture strategy (.CS file) so that it appears in the File name field. The Open Capture Strategy dialog box (Figure 3-5) is an example of a selected capture strategy.

4. Click on the Open button. The selected strategy appears in the Capture Strategy Builder dialog box.

NOTE

Only one capture strategy can be open at a time.

5. Select individual strategy blocks to make changes in the Conditional A and Conditional B sections. Add and delete blocks as necessary.

6. Click on the Save button to save the modified capture strategy over the existing capture strategy.

7. Click on the Load button to load the capture strategy into the analyzer and leave the Capture Strategy Builder.

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5.5 CREATING A NEW STRATEGY FROM AN EXISTING STRATEGY

1. Follow steps 1-5 in Modifying a Capture Strategy to display an existing strategy and change it as desired.

2. Click on the "Save As" button to display the Save Capture Strategy dialog box shown in Figure 5-3. Type a different file name in the File name field to save the new strategy.

CAUTION

Be sure to type a different file name in the File name field to prevent overwriting the original file.

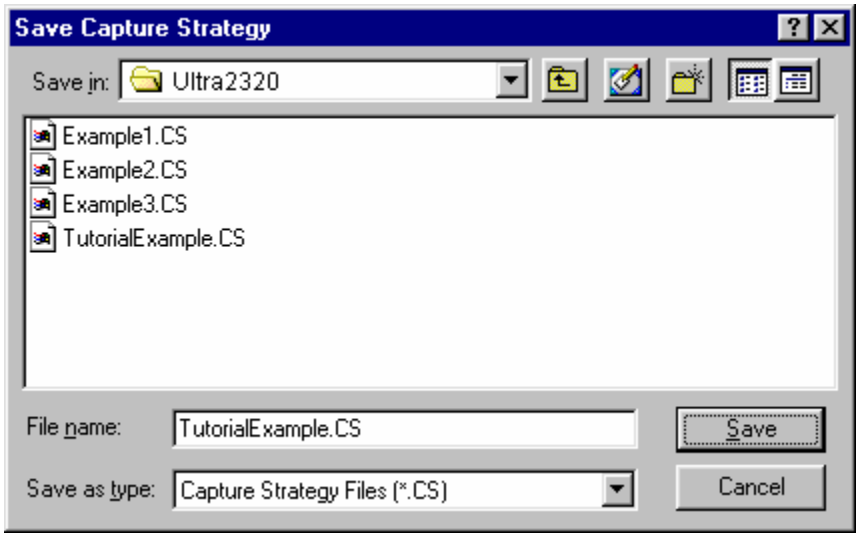

Figure 5-3: Save Capture Strategy Dialog Box

5.6 DELETING A CAPTURE STRATEGY

Delete a capture strategy by doing the following:

1. Select "Capture Strategy Builder" in the Setup pulldown menu or click on the Capture Strategy Builder button on the tool bar. The Capture Strategy Builder dialog box appears. Click on the "Open" button and the Open Capture Strategy dialog box appears.

2. Click with the right mouse button on the capture strategy file to be deleted.

3. Click on "Delete" from the Windows shortcut menu. The Confirm File Delete dialog box appears on the screen.

4. Click on "Yes" to delete the capture strategy.

5. Click on the "Cancel" button to close the dialog box.

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5.7 EXAMPLES OF COMMON STRATEGY CONFIGURATIONS

Several common capture strategy configurations are shown here. You may find that these capture strategies are usable as is or with minor changes. The examples shown here are included as `.CS` files with Ultra2320 software.

5.7.1 Example 1: Analyzer captures only data associated with a specific ID

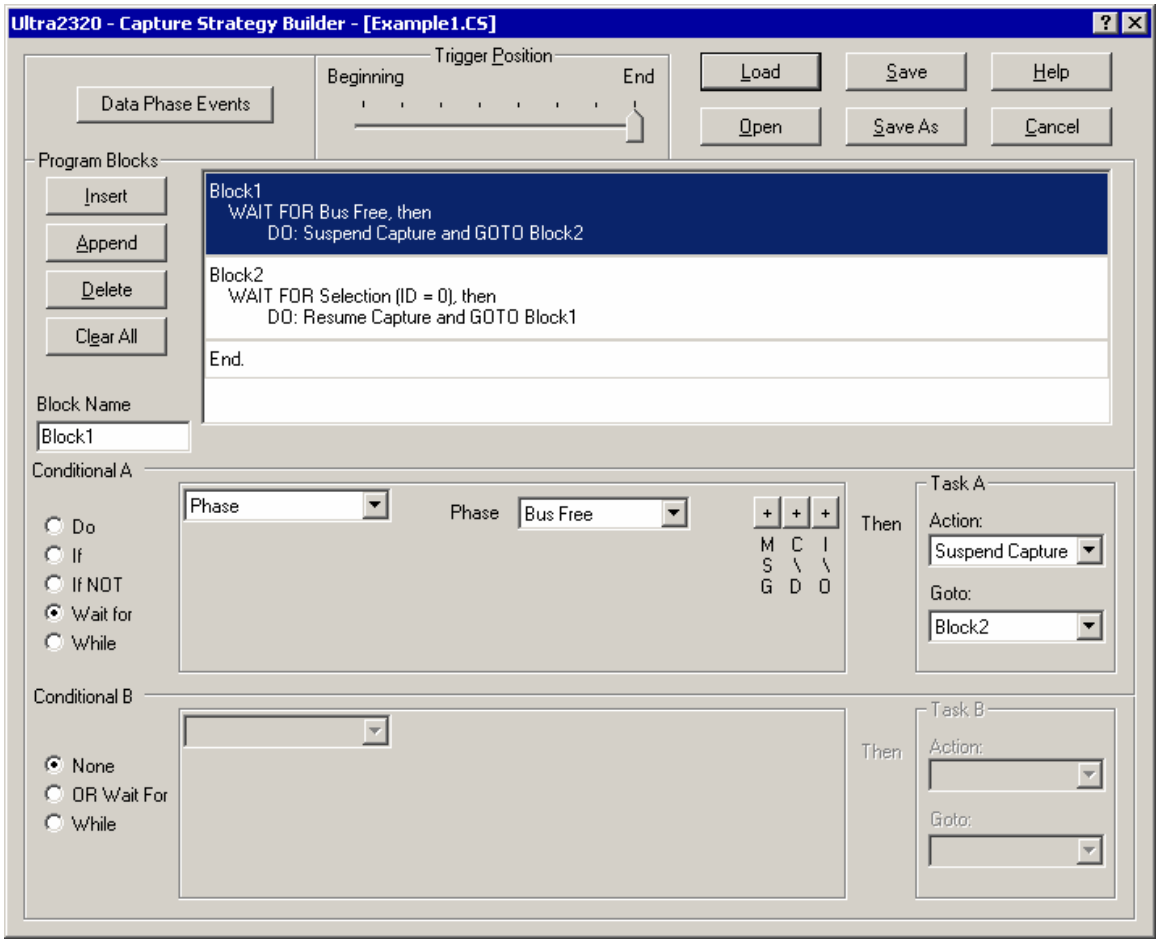

Figure 5-4: Example 1 Capture Strategy Block 1

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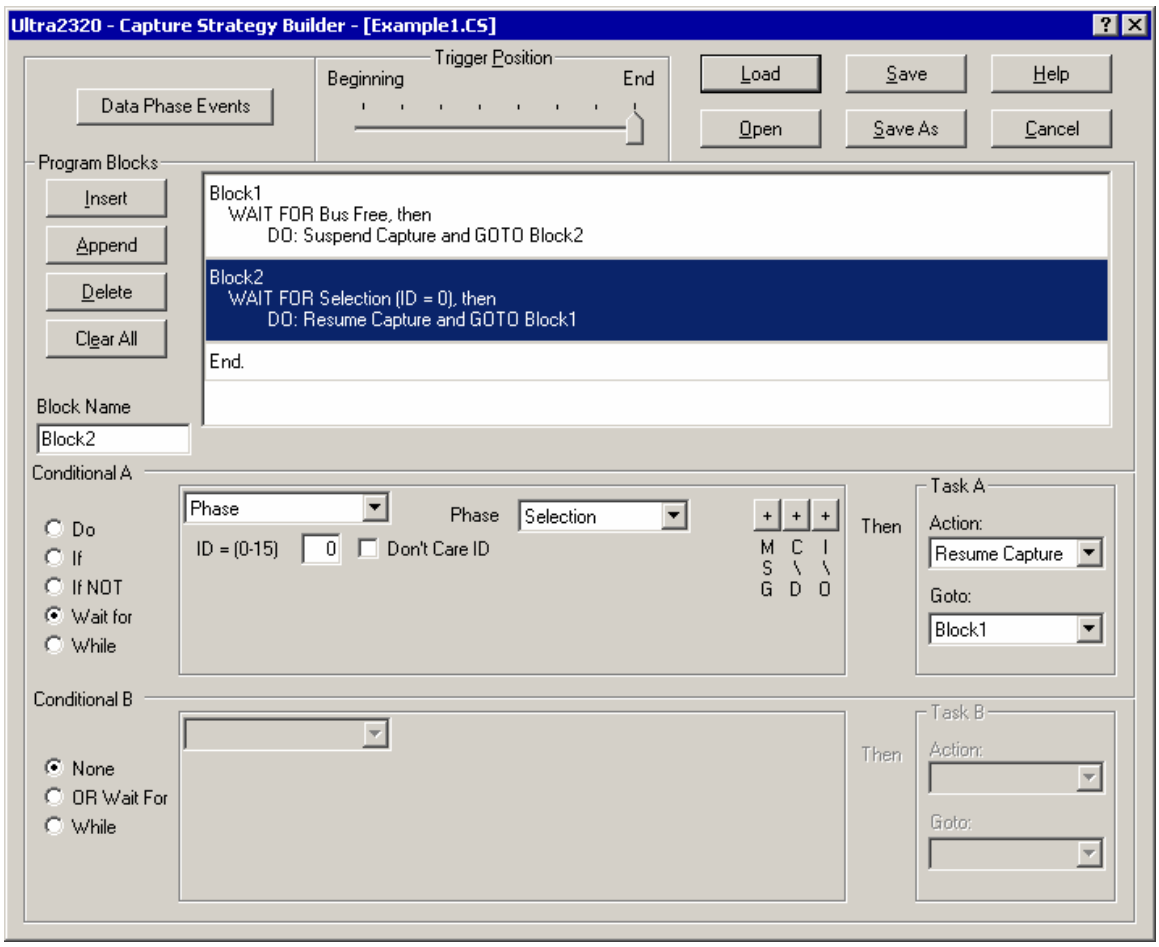

Figure 5.4 Example 1 Capture Strategy Block 2

Analysis: This capture strategy is used to capture only data associated with a specific ID. Block 1 waits for Bus Phase Bus Free to occur. When it does, capture is suspended and execution proceeds to Block 2.

Block 2 waits for a Bus Phase Selection with a specific ID. In this example, only one ID field is verified, causing a Selection match for any activity involving the device associated with the specified ID. When a Selection match is detected, capture is resumed and execution returns to Block 1, waiting for the next Bus Free. See the `EXAMPLE1.CS` file included with Ultra2320 software.

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5.7.2 Example 2: Analyzer detects if the target device violates the SCSI disconnection delay specification

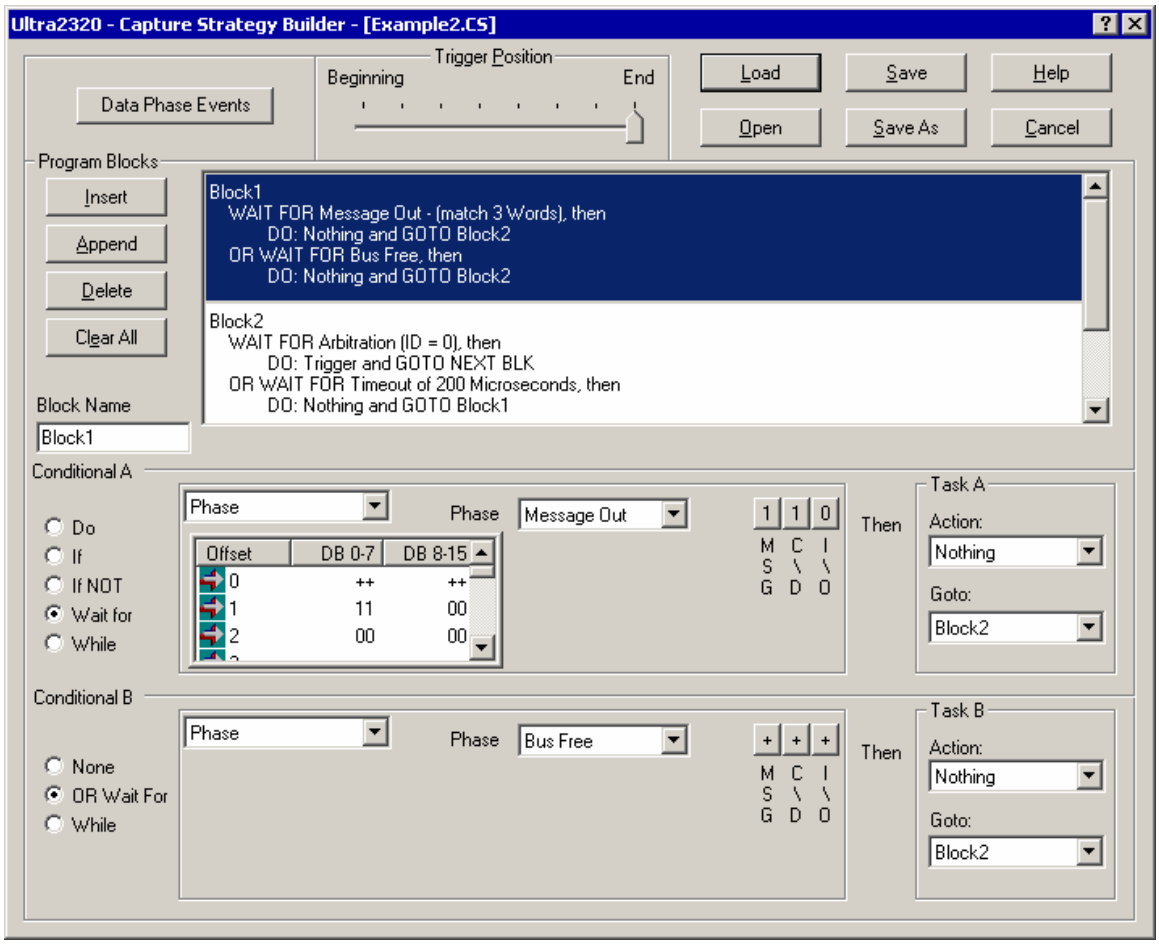

Figure 5-5: Example 2 Capture Strategy Block 1

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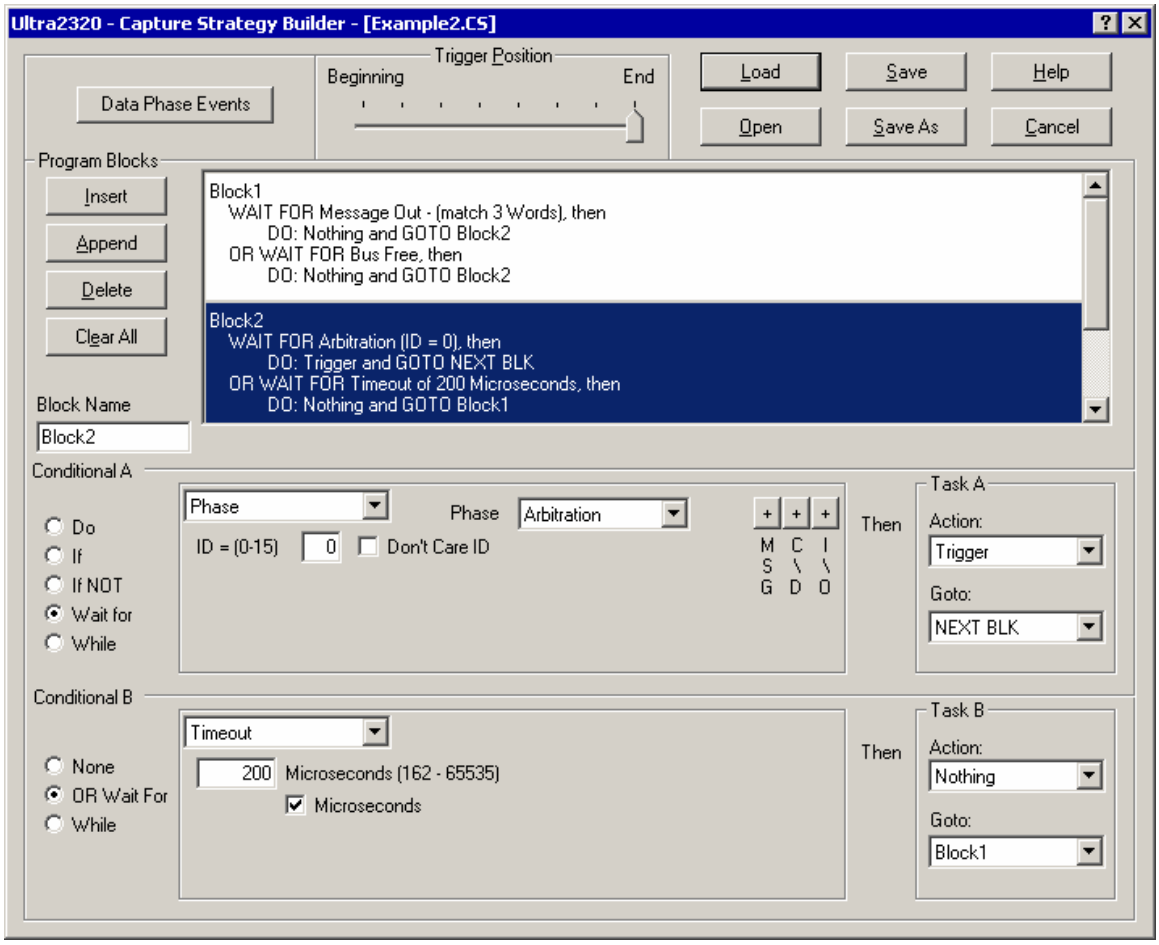

Figure 5-6: Example 2 Capture Strategy Block 2

Analysis: This capture strategy is used to detect if a target device violates the SCSI disconnection delay specification. An emulation system is configured to issue commands to a specific target device (TID 0 in this example), forcing disconnects at particular times by raising ATN and sending a disconnect message to the target. After honoring the disconnect, the target is not allowed to participate in an arbitration for at least 200 µs.

Block 1 waits for a Bus Phase Message Out from the initiator (Conditional A) or a Bus Phase Bus Free (Conditional B). If Conditional A is true, execution proceeds to Block 2. If Conditional B is true, execution proceeds to Block 2.

Block 2 waits for a Bus Phase Arbitration involving ID 0 (Conditional A) or a 200 µs Timeout (Conditional B). If the Arbitration occurs before the Timeout, that is an error and the analyzer is triggered. If the Timeout occurs first, execution starts over with Block 1 waiting for the next disconnect. See the `EXAMPLE2.CS` file included with Ultra2320 software.

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5.7.3 Example 3: Analyzer triggers on unit attention condition

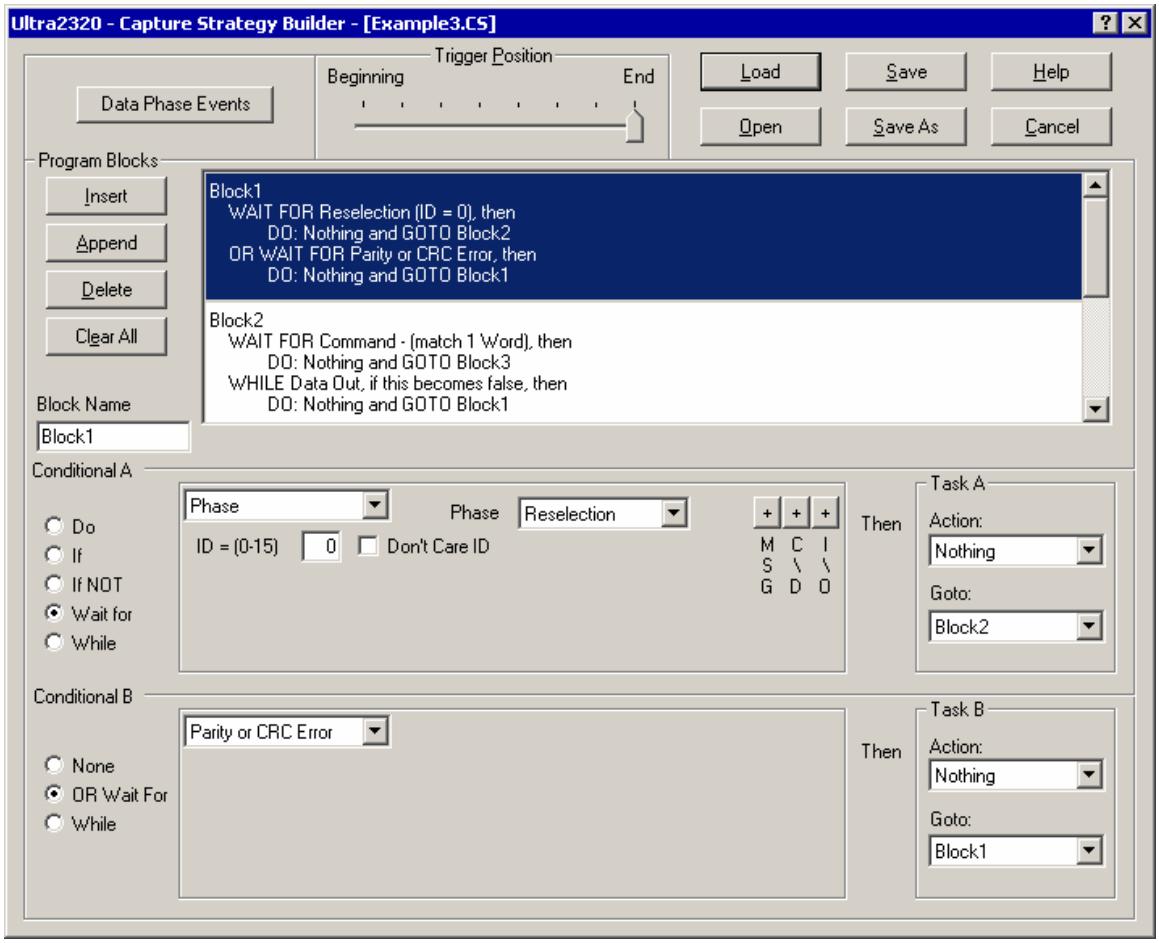

Figure 5-7: Example 3 Capture Strategy Block 1

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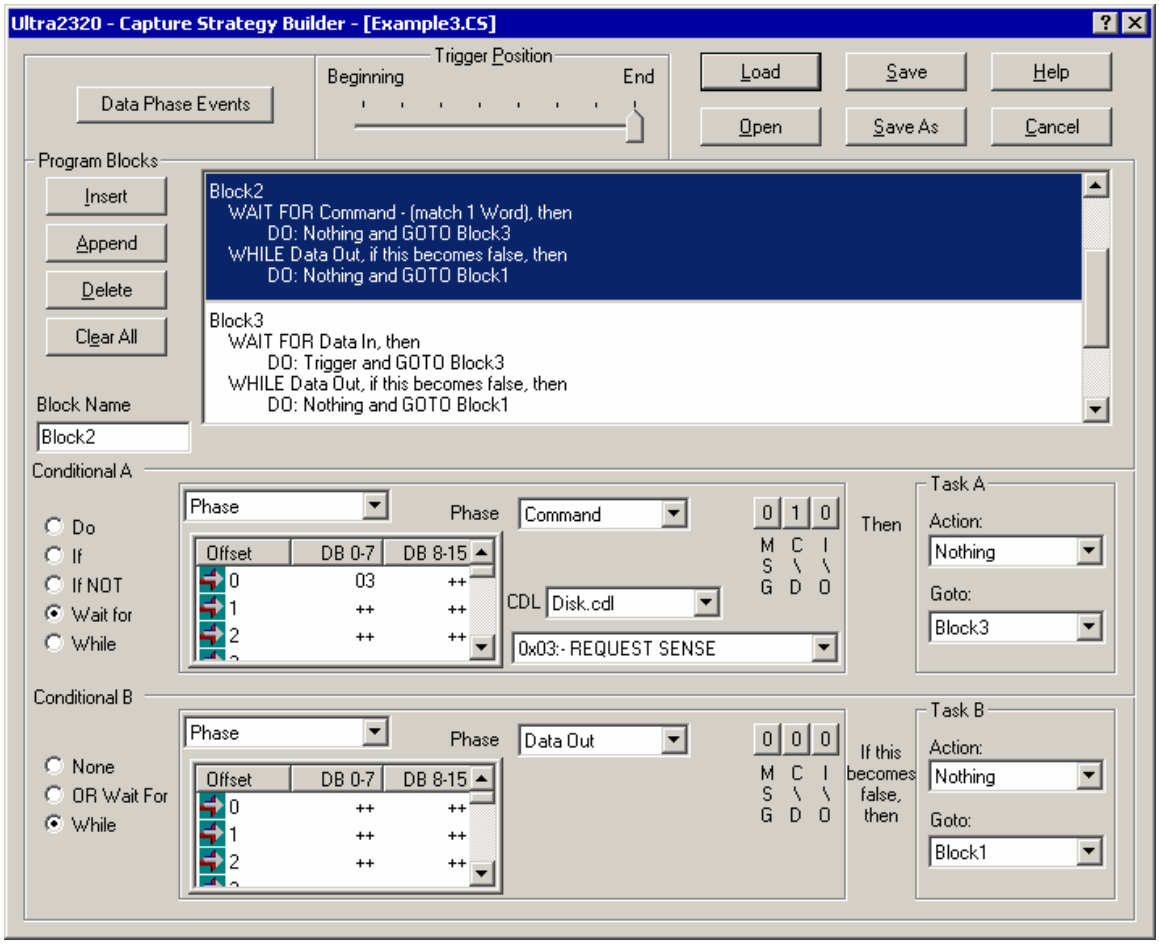

Figure 5-8: Example 3 Capture Strategy Block 2

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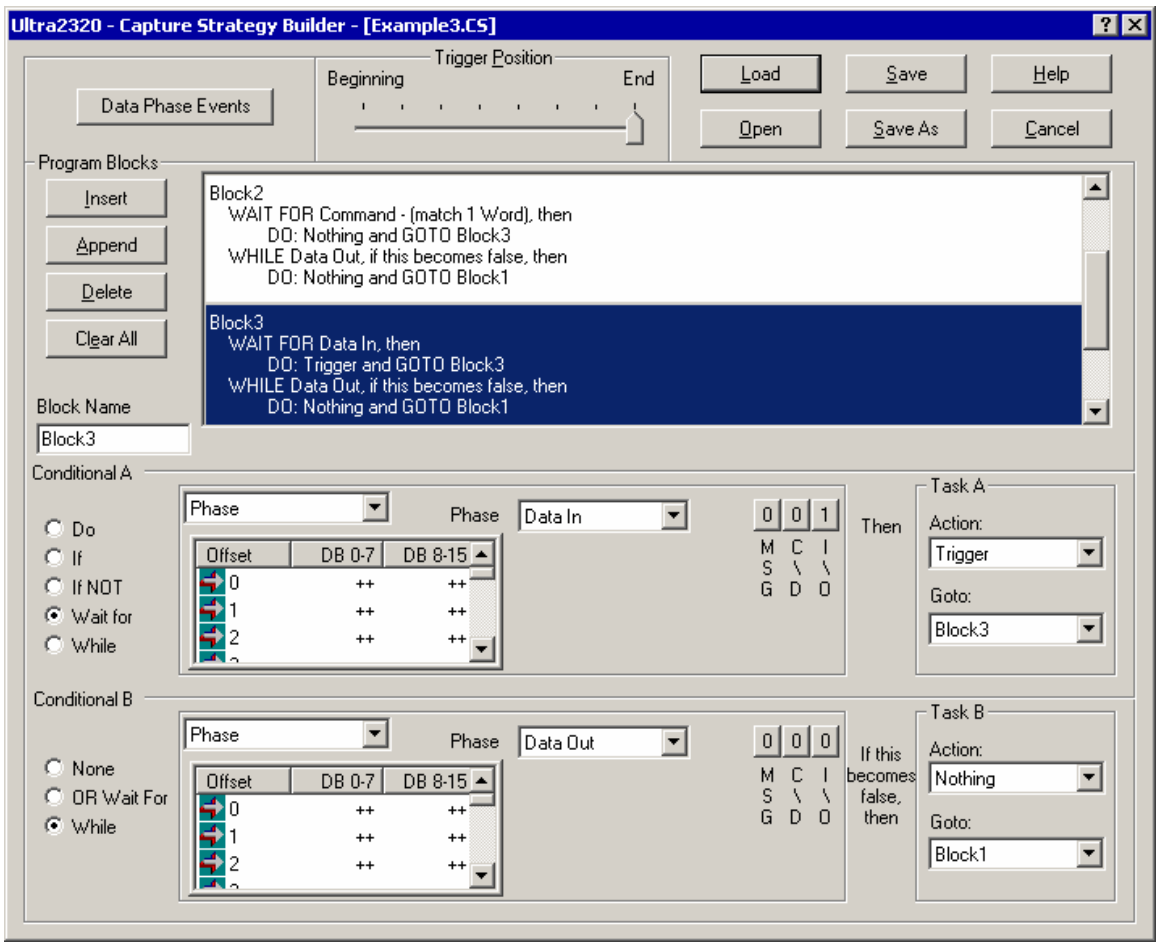

Figure 5-9: Example 3 Capture Strategy Block 3

Analysis: Block 1 waits for Bus Phase Reselection (Test Object A) or Parity or CRC error (Test Object B). If Test Object A is true, no task is performed and execution proceeds to Block 2. If Test Object B is true, no task is performed and execution returns to Block 1.

Block 2 waits for a Bus Phase Command (Test Object A) and a Bus Phase Data Out (Test Object B) to occur. If Test Object A is true, no task is performed and execution proceeds to Block 3. If Test Object B is false, no task is performed and execution returns to Block 1.

Block 3 waits for a Bus Phase Data In (Test Object A) and a Bus Phase Data Out (Test Object B) to occur. If Test Object A is true, a trigger is performed and execution returns to Block 3. If Test Object B is false, no task is performed and execution returns to Block 1. See the `EXAMPLE3.CS` file included with Ultra2320 software.

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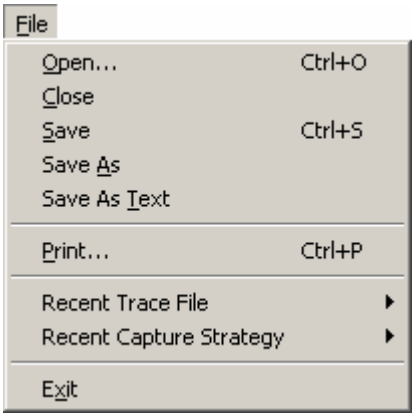
SECTION 6

Analyzer Software Reference

6.1 PULLDOWN MENUS

6.1.1 File Menu Commands



Open…

Opens a single view of a previously saved trace (.TRC file). Displays a directory of saved traces from which to choose. Same as the Open icon on the tool bar.

Close

Closes all views of the currently open trace. *Available only when viewing a trace.*

Save

Saves a newly captured trace. Displays the Save As dialog box, which prompts for information on the file to be saved. Same as the Save icon on the tool bar. *Available only when viewing a trace.*

Save As

Saves a modified trace with a different file name. Displays the Save As dialog box, which prompts for information on the file to be saved. *Available only when viewing a trace.*

Save As Text

Saves trace data as a text file to be viewed and edited using a text editor. Displays the Save As Text dialog box, which prompts for information on the file to be saved. *Available only when viewing a trace.*

Print…

Prints an active trace view. Displays the Page Setup dialog box for selecting a printer and the print range. *Available only when viewing a capture strategy or a trace.*

Recent Trace File

Lists the four most recently accessed trace files. Selecting one of these files opens the specified trace file for viewing.

Recent Capture Strategy

Lists the four most recently loaded capture strategies. Selecting one of these files loads the capture strategy for capturing data. *Available only when connected to an analyzer.*

Exit

Exits Ultra2320 software and returns to the Windows desktop. A prompt will appear as a reminder to save any newly captured traces.

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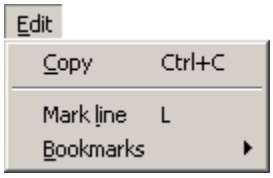
6.1.2 Edit Menu Commands

Pulldown menu available only when viewing a trace.



Copy

Copies the highlighted range of trace display data in an active trace view to the Clipboard, replacing any data already stored there.

Mark line

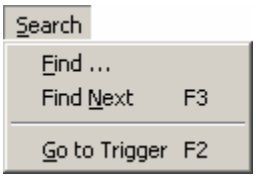
Marks the current line in an active trace view.

Bookmarks

Displays a menu for adding a bookmark, deleting a bookmark, and displaying the Bookmark List dialog box.

6.1.3 Search Menu Commands

Pulldown menu available only when viewing a trace.



Find…

Displays the Search Mask Editor dialog box for defining search parameters in a trace view. Same as the Find icon on the tool bar.

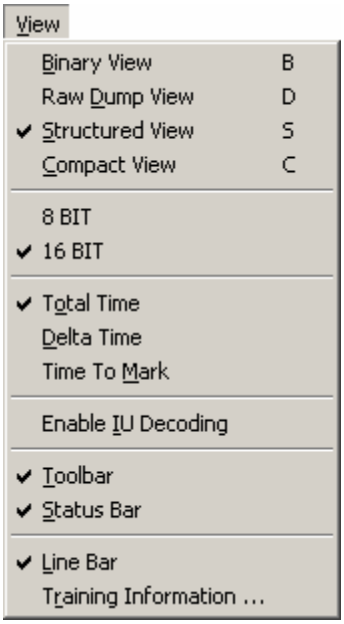
Find Next

Continues the search initiated in the active trace view for an entry that matches the parameters previously set in the Search Mask Editor dialog box. If a match is found, the cursor moves to the matching entry. If no match is found, the cursor remains on the line where the search was initiated. Same as the Find Next icon on the tool bar.

Go to Trigger

Searches the active trace view for trigger information. If trigger information is found, the cursor moves to the record containing the first trigger. If no triggers are found, the cursor remains on the line where the search was initiated.

6.1.4 View Menu Commands



Binary View

Replaces the active trace view with the binary trace view. Same as the binary view icon on the tool bar. *Available only when viewing a trace.*

Raw Dump View

Replaces the active trace view with the raw dump trace view. Same as the Raw Dump View icon on the tool bar. *Available only when viewing a trace.*

Structured View

Replaces the active trace view with the structured trace view. Same as the Structured View icon on the tool bar. *Available only when viewing a trace.*

Compact View

Replaces the active trace view with the compact trace view. Same as the Compact View icon on the tool bar. Available only when viewing a trace.

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8 Bit

Changes the current trace view to 8-bit format. The analyzer always captures 16 bits wide, but if the bus is operating only 8 bits wide, errors (such as parity errors) may be indicated on the upper data byte. These can be eliminated by displaying the trace view in 8-bit mode. *Available only when viewing a trace.*

16 Bit

Changes the current trace view to 16-bit format. The analyzer always captures 16 bits wide, but if the bus is operating only 8 bits wide, an 8-bit display is more suitable. *Available only when viewing a trace.*

Total Time

Changes the time stamp mode in the active trace view to the Total Time mode. The time stamp associated with each line indicates the elapsed time. *Available only when viewing a trace.*

Delta Time

Changes the time stamp mode in the active trace view to the Delta Time mode. The time stamp associated with each line indicates the duration of that line. *Available only when viewing a trace.*

Time to Trigger

Changes the time stamp mode in the active trace view to the Time to Trigger mode. The time stamp associated with each line indicates the elapsed time between the line and the line containing the triggering event. If there is no trigger in the trace, this mode is identical to the Total Time mode. *Available only when viewing a trace.*

Time to Mark

Changes the time stamp mode in the active trace view to the Time to Mark mode. The time stamp associated with each line indicates the elapsed time between the line and the marked line. *Available only when viewing a trace.*

Enable IU Decoding

Displays or hides Information Unit (IU) decoding. This selection is enabled by default. *Available only when viewing a trace in structured or compact views.*

Tool Bar

Displays or hides the tool bar. The tool bar contains icons for executing common commands. It is located near the top of the screen but can be repositioned to attach to any edge of the main window or to float within the main window.

Status Bar

Displays or hides the status bar. The status bar indicates the hardware status, Time to Mark mode, name of the loaded capture strategy program, active record number out of the total record number, and identifies pulldown menu selections. It is located at the bottom of the main window and cannot be repositioned.

Line Bar

Displays or hides the line bar. When the analyzer is running, the line bar indicates the state of each SCSI control line in real time. It is normally located near the bottom of the screen, but it can be repositioned to attach to any edge of the main window or to float within the main window.

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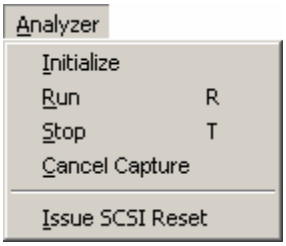
6.1.5 Analyzer Menu Commands



Initialize

Initializes the analyzer in the unlikely event that the XILINX parts have lost their programming.

Run and Restart

Starts or restarts a capture session. Starting the analyzer turns control over to the capture strategy state machine, which determines the types of events to be captured and the triggering condition (if any). After the analyzer is started, Restart replaces the Run selection. Same as the Start icon in the tool bar. Restart stops the analyzer, discards the captured data, and restarts the analyzer. Same as the Restart icon in the tool bar.

Stop

Stops a capture session. Stopping the analyzer halts the capture strategy state machine and further data capture. The New View Format dialog box appears on the screen requesting you to select a formatted trace view. The captured data is formatted into the selected trace view. Same as the Stop icon in the tool bar.

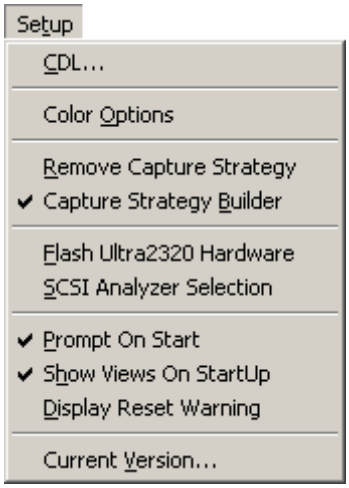
Cancel Capture

Stops a capture session, discards the captured data, and returns you to the interactive menu without displaying the formatted trace view.

Issue SCSI Reset

Stops the analyzer, discards the captured data, and restarts the analyzer. Same as the Restart icon in the tool b Stops a capture session, discards the captured data, and returns you to the interactive menu without displaying the formatted trace view.

6.1.6 Setup Menu Commands



CDL…

Displays the CDL Assignment dialog box to specify a CDL for each bus ID.

Color Options

Displays the View Colors dialog box for changing the default colors of objects in a trace view.

Remove Capture

Removes the loaded capture strategy and returns the main menu to default settings.

Capture Strategy Builder

Displays the Capture Strategy Builder dialog box for creating a complex capture strategy through the configuration of strategy blocks for real-time data capture and triggering by the analyzer.

Flash Ultra2320 Hardware

Displays the Ultra2320 Flash dialog box for updating the firmware.

SCSI Analyzer Selection

Displays the SCSI Analyzer Selection dialog box for finding and selecting an analyzer.

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Prompt on Start

Turns a save prompt on or off. If this feature is turned off, the newly captured trace is discarded without prompting you first to save it. If this feature is turned on, the Ultra2320 software prompts you to save the newly captured trace.

Show Views on Startup

Displays the New View Format dialog box for selecting a formatted trace view when a trace is opened or newly captured.

Display Reset Warning

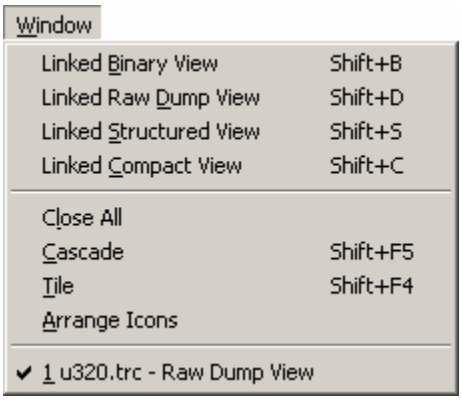
Enables a Warning screen to be displayed asking if you want to continue to issue a SCSI reset signal over the SCSI bus when clicking on the SCSI RST button on the tool bar or selecting Issue SCSI Reset in the Analyzer pulldown menu.

Current Version…

Displays the current hardware settings, providing you with information on the installed hardware.

6.1.7 Window Menu Commands

Pulldown menu available only when viewing a trace.



Linked Binary View

Displays the trace in the active window in the binary trace view, adding to any trace views already on the screen.

Linked Raw Dump View

Displays the trace in the active window in the raw dump trace view, adding to any trace views already on the screen.

Linked Structured View

Displays the trace in the active window in the structured trace view, adding to any trace views already on the screen.

Linked Compact View

Displays the trace in the active window in the compact trace view, adding to any trace views already on the screen.

Close All

Closes all currently opened traces. Available only when viewing a trace.

Cascade

Overlaps trace views and a capture strategy on the screen.

Tile

Positions trace views and a capture strategy on the screen so they are all equally visible.

Arrange Icons

Arranges the icons for minimized windows at the bottom of the screen. If an open document window is at the bottom of the screen, some or all of the icons will be underneath this document window and will not be visible.

Window 1, 2 …

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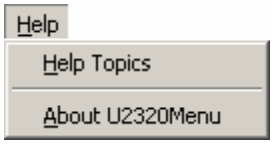
Lists the currently open trace views and capture strategy with a checkmark indicating the active view. Select a trace view or a capture strategy from this list to make it active.

6.1.8 Help Menu Commands

Help Topics

Lists the help topics in the Ultra2320 online help. Online help provides step-by-step instructions and reference information for using Ultra2320 software.



About U2320Menu

Displays the copyright information and Ultra2320 software version number.

6.2 MAIN MENU TOOL BAR

Open Trace icon
Opens an existing trace. Displays a directory of saved traces for selecting a trace file. Same as the Open selection in the File pulldown menu.

Save Trace icon
Displays the Save As dialog box for saving the active trace file. Same as the Save selection in the File pulldown menu.

Run/Restart icon
Starts or restarts the analyzer. Run and Restart are the same button in the tool bar, depending on what the analyzer is doing. If it is running, the Restart icon is available; if it is stopped, the Run icon is available. Pressing the Restart icon while the analyzer is running discards the current trace and restarts trace capture.

Stop icon
Stops the analyzer, and displays the data in the selected trace view format..

Raw Dump View icon
Replaces the active trace view with the raw dump trace view. Same as the Raw Dump View selection in the View pulldown menu.

Binary View icon
Replaces the active trace view with the binary trace view. Same as the Binary View selection in the View pulldown menu.

Structured View icon
Replaces the active trace view with the structured trace view. Same as the Structured View selection in the View pulldown menu.

Compact View icon
Replaces the active trace view with the compact trace view. Same as the Compact View selection in the View pulldown menu.

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Find icon
Displays the Search Mask Editor dialog box for defining parameters for which to search in a trace view. Same as the Find selection in the Search pulldown menu.

Find Next icon
Continues the search initiated in the active trace view for an entry that matches the parameters previously set in the Search Mask Editor dialog box. If a match is found, the cursor moves to the matching entry. If no match is found, the cursor remains on the line where the search was initiated. Same as the Find Next selection in the Search pulldown menu.

Capture Strategy Builder icon
Allows you to create a complex capture strategy through the configuration of strategy blocks for real-time data capture and triggering by the analyzer. Same as the Capture Strategy Builder selection in the Setup pulldown menu.

Load Strategy icon
Loads a capture strategy (.CS) file previously created in the Capture Strategy Builder dialog box.

Enable/Diable IU Decoding icon
Displays or hides Information Unit (IU) decoding. This selection is enabled by default. Available only when viewing a trace in phase or thread views.

SCSI Reset icon
Sends a SCSI reset signal over the SCSI bus. If selected, the Display Reset Warning checkbox enables a Warning screen to be displayed asking if you want to continue when selecting Issue SCSI Reset or clicking on the SCSI RST button on the tool bar. Click on the Yes button to proceed or the No button to cancel the action and return to the interactive menu. Same as the Issue SCSI Reset selection in the Analyzer pulldown menu.

Help Topics icon
Lists the help topics in the Ultra2320 online help. Online help provides step-by-step instructions and reference information for using Ultra2320 software. Same as the Help Topics selection in the Help pulldown menu.

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6.3 KEYBOARD SHORTCUTS

Function	**Keystroke**
Binary View	B
Cascade	Shift + F5
Compact View	C
Copy	Ctrl + C
Enable IU Decoding	I
Exit	Alt + F4
Find Next	F3
Flip between wide and narrow data displays	W
Flip between elapsed and delta time	E
Flip between structured and other view	F
Go to Trigger	F2
Mark Line	M
New Raw Dump View	Shift + D
New Structured View	Shift + S
New Compact View	Shift + C
New Binary View	Shift + B
Open	Ctrl + O
Print	Ctrl + P
Raw Dump View	D
Restart	R
Run Analyzer	R
Save	Ctrl + S
Stop Analyzer	T
Structured View	S
Tile	Shift + F4

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APPENDIX A

Ultra2320 Notebook Companion Installation Guide (PCI-Cardbus Expansion System)

A.1 INTRODUCTION

The PCI -Cardbus expansion system enables laptop computers to add an external PCI slot to the computer. The expansion hardware consists of an external chassis with a PCMCIA to PCI bridge inside and is powered by an external power supply. The interface from the computer to the expansion chassis is achieved by installing a PCMCIA CardBus adapter into the laptop PCMCIA slot and then attaching special high-density cable to the adapter and the expansion chassis. After all drivers are installed the external PCI card can now communicate directly to the laptop local PCI-bus via the PCMCIA Cardbus adapter.

INSTALLATION STEPS AT A GLANCE

STEP 1:	PCI expansion chassis hardware installation.
STEP 2:	Ultra2320 driver installation.
STEP 3:	Ultra2320 Application software installation.
NOTE:	**It is very important to follow the above sequence when installing this system to insure proper operation.**

System components provided:

1 PCI expansion cable (1-meter)
1 Cardbus PCMCIA adapter
1 AC-DC power brick (45 Watt Auto-switching)
1 Power supply cable
1 Expansion chassis OEM (MAGMA) user's manual
1 Installation software CD

A.2 SUPPORTED OPERATING SYSTEMS

Special Instructions	Operating Systems
A PCI CardBus Driver is required for Windows NT.	Windows NT 4.0
A PCI CardBus Driver is required for Windows 2000.	Windows 2000

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A.3 STEP 1: PCI EXPANSION SYSTEM HARDWARE INSTALLATION

WARNING

Before proceeding make sure all devices are powered off.

1. Insert the supplied Cardbus PCMCIA adapter into the upper slot (slot-0) of the laptop computer. Slot –0 (zero) is usually the upper slot.

2. Connect one end of the supplied PCI expansion cable (1-meter) to rear connector of the expansion chassis and the other end to the PCMCIA adapter.

3. Connect the barrel jack of the supplied AC-DC Power Brick into the rear of the expansion chassis.

4. Connect the supplied AC cord to the power brick and then plug into an AC power source. Check to see that the expansion chassis green LED on rear of chassis is on.

5. The next step requires the user to determine the Operating System which the Expansion chassis will be installed on and then proceed to the appropriate instructions that follow for each operating system.

If you are installing on a computer with Windows NT… Start here with Section A.3.1. For Windows 2000 instructions please go to the Win2000 section that follows in Section A.3.2.

A.3.1 Windows NT Instructions

WARNING

You will be prompted to shut down and reboot your system several times during software installation. Please be patient, each shut down and reboot does serve a purpose and is required for correct installation.

NOTE

Under Windows NT, you MUST connect the PCI expansion chassis to your computer BEFORE installing the PCI CardBus driver.

PCI CardBus drivers are required for Windows-NT. It is important to apply power to the expansion chassis first, and then apply power to your computer.

WARNING

You must be logged in as "System Administrator" while installing the PCI expansion chassis. You must remain logged in as "System Administrator" until installation is complete.

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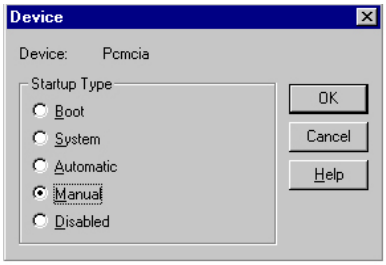
Special Instructions for Windows NT Service Pack 6

If you are running Windows NT Service Pack 6, you must disable **Pcmcia** under **Control Panel** before installing the PCI CardBus driver. If you are not running Service Pack 6, you may skip this step.

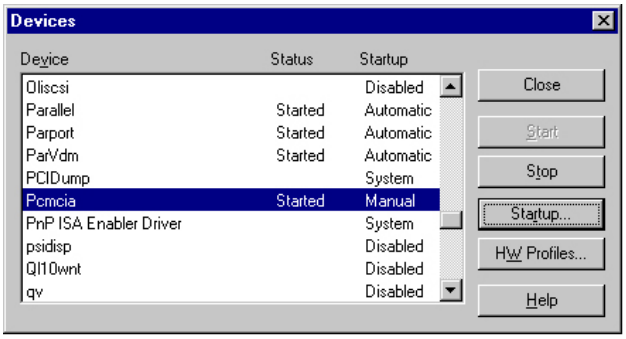
Go to Start → Settings → Control Panel → Devices → Pcmcia → Startup… → Choose Manual



Click OK and the following *Devices* Window will appear:

Devices
Changing the Startup Type for the Pcmcia device may leave the system in an unusable state. Do you want to make the change?
Yes
No
Cancel

Click Yes. The Devices Window should now look like this:



Click Close.

Install the PCI CardBus Driver included on the Supplied CD "PCI CardBus Drivers":

CD ---"PCI Cardbus drivers"
PCI Expansion Install
setup.exe

The following InstallShield Wizard Window will appear:

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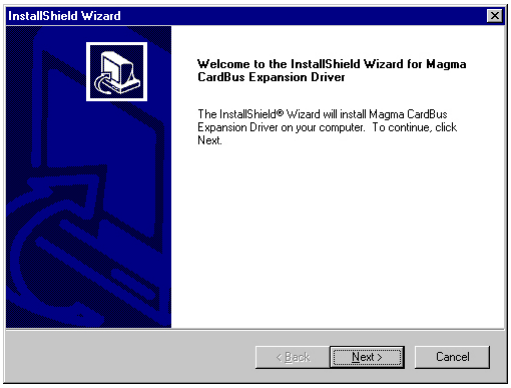
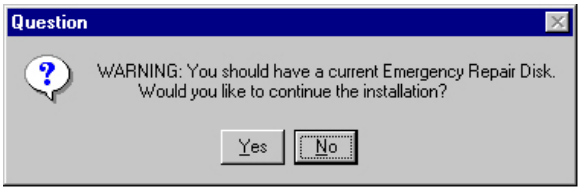
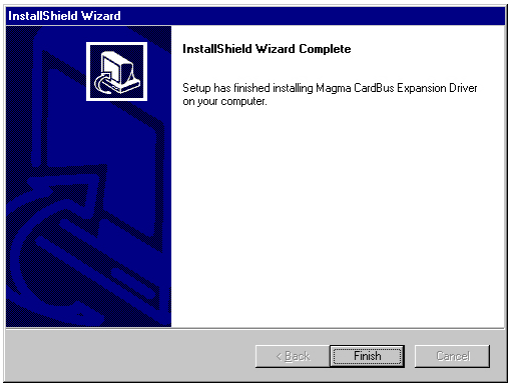

InstallShield Wizard
Welcome to the InstallShield Wizard for Magma CardBus Expansion Driver
The InstallShield® Wizard will install Magma CardBus Expansion Driver on your computer. To continue, click Next.
< Back
Next >
Cancel

Click Next > and the following *Question* Window will appear:

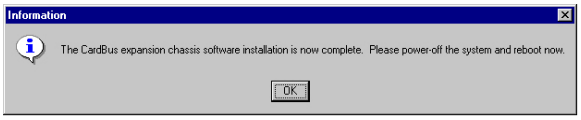


Make sure that you have a current Emergency Repair Disk prepared and Click Yes.

The following InstallShield Wizard Window will appear:



Click Finish and an Information Window will appear:


Information
The CardBus expansion chassis software installation is now complete. Please power-off the system and reboot now.
OK

You should now Shut Down the computer. This means, **turn off** your computer **completely**.

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After you have **Shut down** completely, it's time to power-up again. As your system comes up, you will be prompted to load or locate drivers. Proceed to Step 2 (U2320 Driver installation).

WARNING

After installation of a new Microsoft Service Pak, you should always reinstall the PCI CardBus Driver.

A.3.2 Windows 2000 Instructions

WARNING

You WILL be prompted to Shut Down and Reboot your system several times during software installation. Please be patient, each Shut Down and Reboot does serve a purpose and is required for correct installation.

NOTE

Under Windows 2000, you MUST connect the PCI expansion chassis to your computer BEFORE installing the PCI CardBus Driver.

PCI CardBus Drivers are required for Windows 2000. It is important to apply power to the expansion chassis first, and then apply power to your computer.

WARNING

You must be logged in as "System Administrator" while installing the PCI expansion chassis. You must remain logged in as "System Administrator" until installation is complete.

The first time your system boots up, with the expansion chassis connected, the following *System Settings Change* Window will appear:

System Settings Change
Windows 2000 has finished installing new devices. You must restart your computer before the new settings will take effect.
Do you want to restart your computer now?
Yes
No

During this first boot of the computer with the Expansion chassis attached Windows 2000 Plug and Play utility will automatically detect the external expansion bridge device and install the appropriate driver from the generic driver database included in all Win2000 installations.

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Again, this step is fully automatic and requires a reboot to proceed.

WARNING

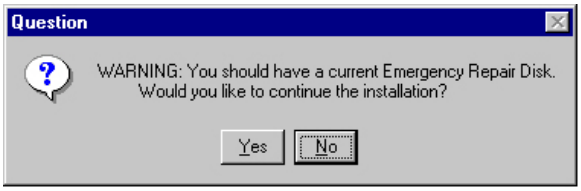
Although you have not installed the PCI CardBus Driver yet, it is important that you answer "Yes" to the above question and **restart your computer**.

Click Yes. Your computer will restart.

After your system comes up, install the PCI CardBus Driver included on the PCI CardBus CD:

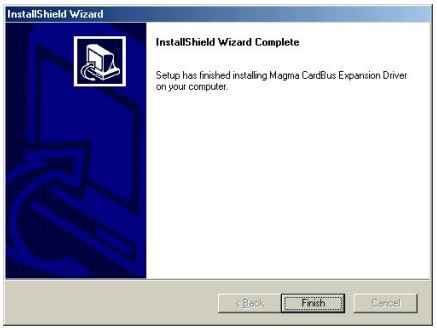
CD
PCI expansion Install
setup.exe

The following Question Window will appear:

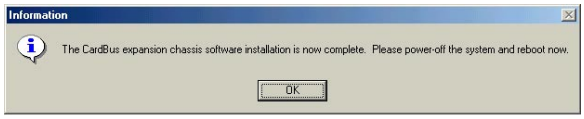


Make sure that you have a current Emergency Repair Disk prepared.

Click Yes and the following InstallShield Wizard Window will appear:



Click Finish and an *Information* Window will appear:


Information
The CardBus expansion chassis software installation is now complete. Please power-off the system and reboot now.
OK

You should now Shut down the computer. This means, **turn off** your computer **completely**.

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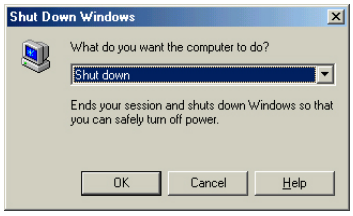
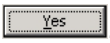

Shut Down Windows
What do you want the computer to do?
Shut down
Ends your session and shuts down Windows so that you can safely turn off power.
OK
Cancel
Help

After you have **Shut down** completely, it's time to power-up again. The following *System Settings Change* Window will appear.

System Settings Change
Windows 2000 has finished installing new devices. You must restart your computer before the new settings will take effect.
Do you want to restart your computer now?
Yes
No

Click  . Your computer will reboot.

As your system comes up, you will be prompted to load or locate drivers for new hardware found. Proceed to STEP 2 (Ultra2320 Driver installation) .

A.4 STEP 2: ULTRA2320 DRIVER INSTALLATION.

Once the PCI Expansion card and driver are loaded and functioning you can now proceed with the installation of the U2320 Driver install.

IMPORTANT NOTE

The U2320 Expansion chassis MUST be powered on FIRST to ensure proper installation. Make sure you have the Expansion system powered on before you power on the computer.

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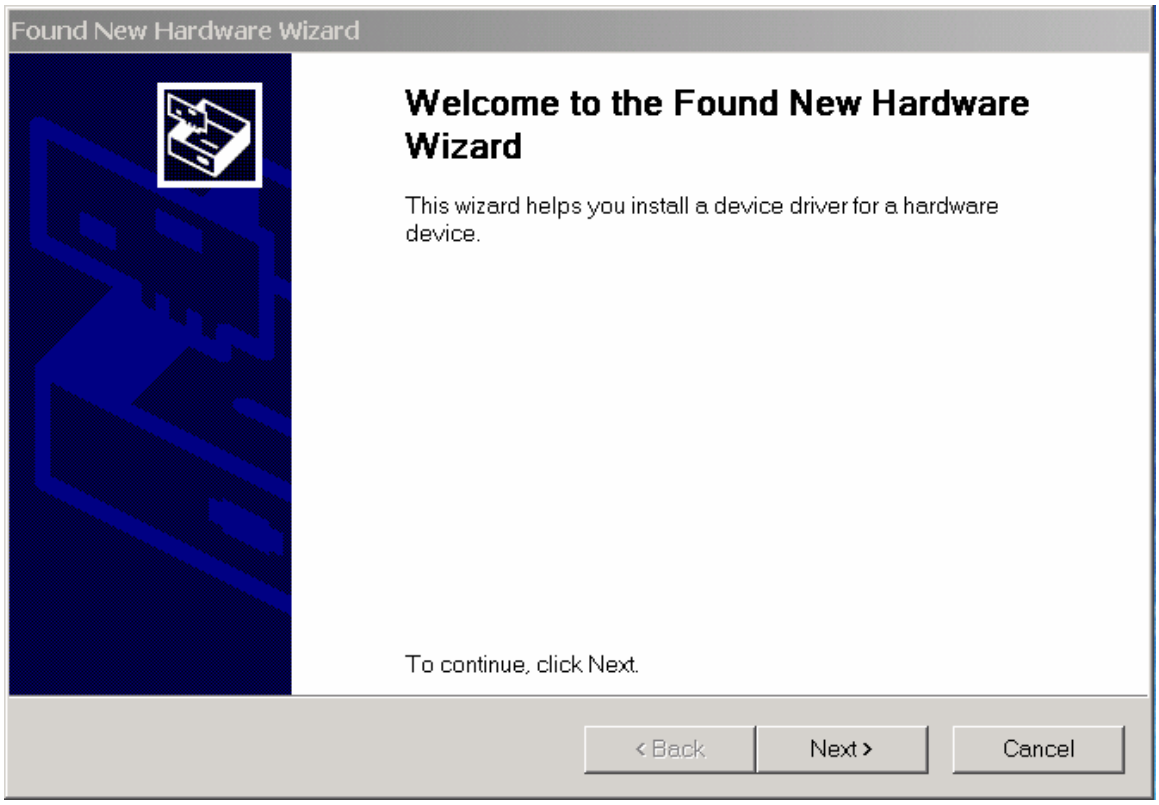
After you have installed the PCI Cardbus expansion system outlined in Step 1 and rebooted , Win2000 Plug and Play will detect new hardware and launch the "Found New Hardware Wizard".


Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install a device driver for a hardware device.
To continue, click Next.
< Back
Next >
Cancel

The following screen will ask how to find the appropriate driver for the new PCI device (U2320 card). Leave the default selection *"Search for suitable driver for my device (recommended) "* selected. Insert the supplied, U2320 Software CD then Click "*next"* to continue.

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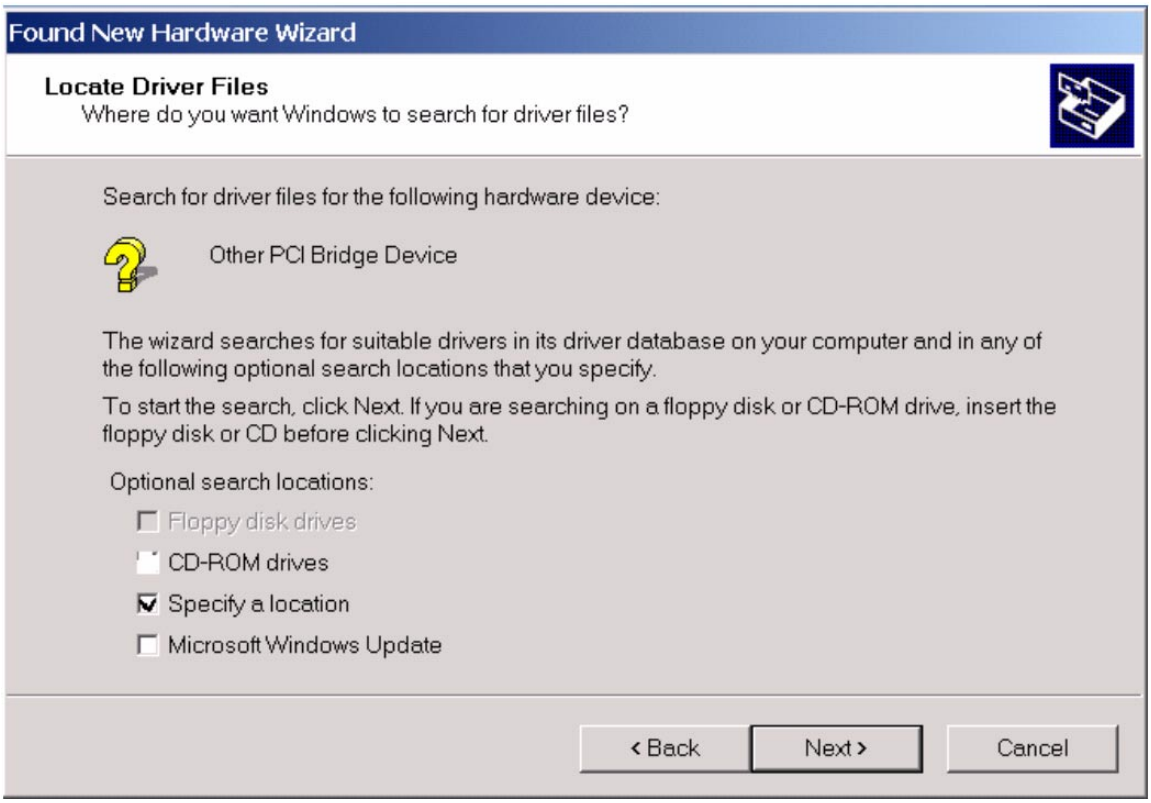
Found New Hardware Wizard
Install Hardware Device Drivers
A device driver is a software program that enables a hardware device to work with an operating system.
This wizard will complete the installation for this device:
PCI Device
A device driver is a software program that makes a hardware device work. Windows needs driver files for your new device. To locate driver files and complete the installation click Next.
What do you want the wizard to do?
Search for a suitable driver for my device (recommended)
Display a list of the known drivers for this device so that I can choose a specific driver
< Back
Next >
Cancel

Choose "Specify a location" and click next to continue.


Found New Hardware Wizard
Locate Driver Files
Where do you want Windows to search for driver files?
Search for driver files for the following hardware device:
Other PCI Bridge Device
The wizard searches for suitable drivers in its driver database on your computer and in any of the following optional search locations that you specify.
To start the search, click Next. If you are searching on a floppy disk or CD-ROM drive, insert the floppy disk or CD before clicking Next.
Optional search locations:
Floppy disk drives
CD-ROM drives
Specify a location
Microsoft Windows Update
< Back
Next >
Cancel

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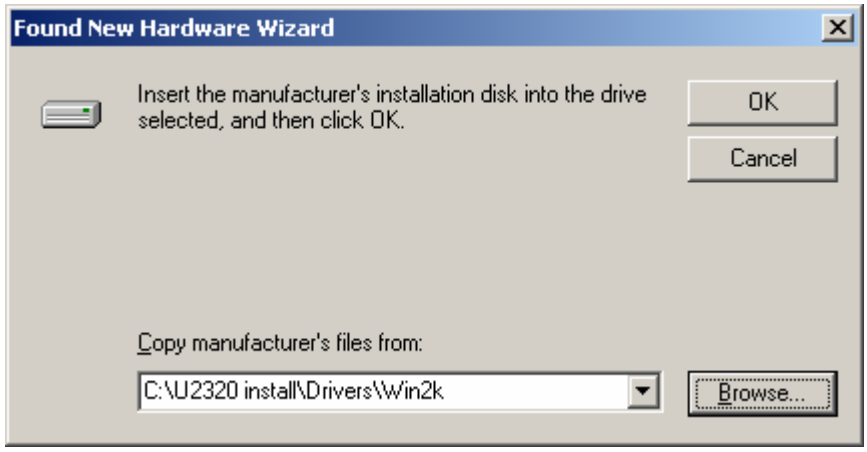
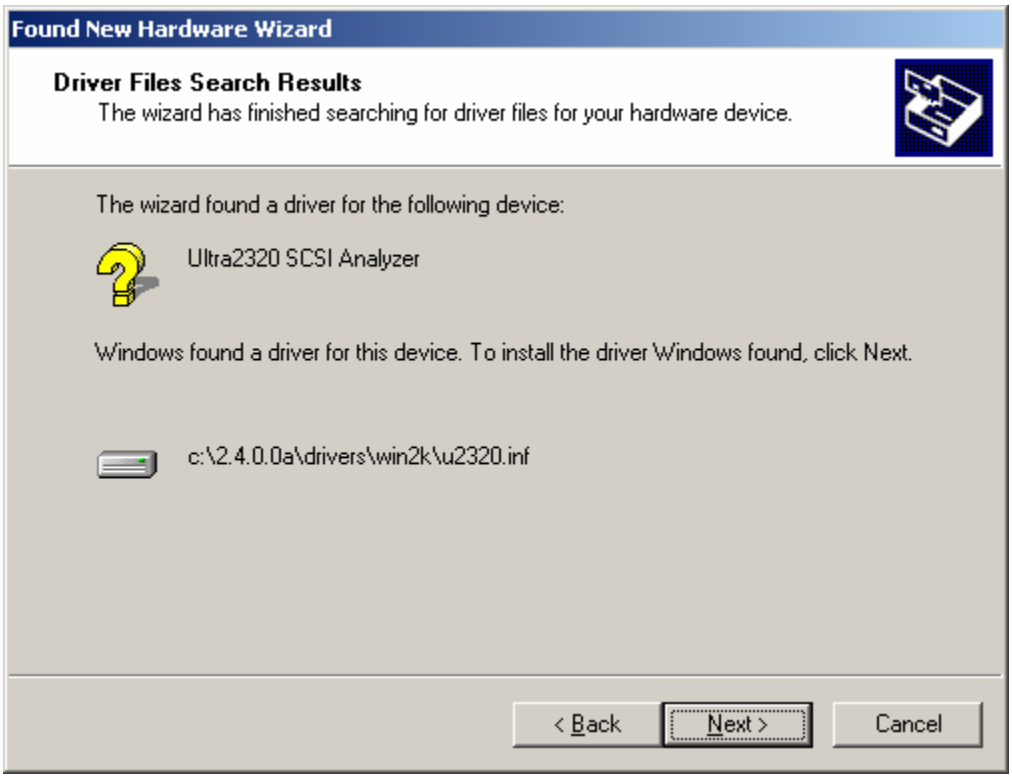
Browse to the following directory on supplied CDROM and then Click OK to continue.

…….D:\Ultra2320 Install\Drivers\Win2k



The hardware wizard should now find the driver file "U2320.INF" for the Ultra2320 SCSI Analyzer. Click "Next" to continue.


Found New Hardware Wizard
Driver Files Search Results
The wizard has finished searching for driver files for your hardware device.
The wizard found a driver for the following device:
Ultra2320 SCSI Analyzer
Windows found a driver for this device. To install the driver Windows found, click Next.
c:\2.4.0.0a\drivers\win2k\u2320.inf
< Back
Next >
Cancel

The hardware wizard will install the proper drivers and indicate as illustrated below that it has completed the installation of the "*Ultra2320 SCSI Analyzer*".

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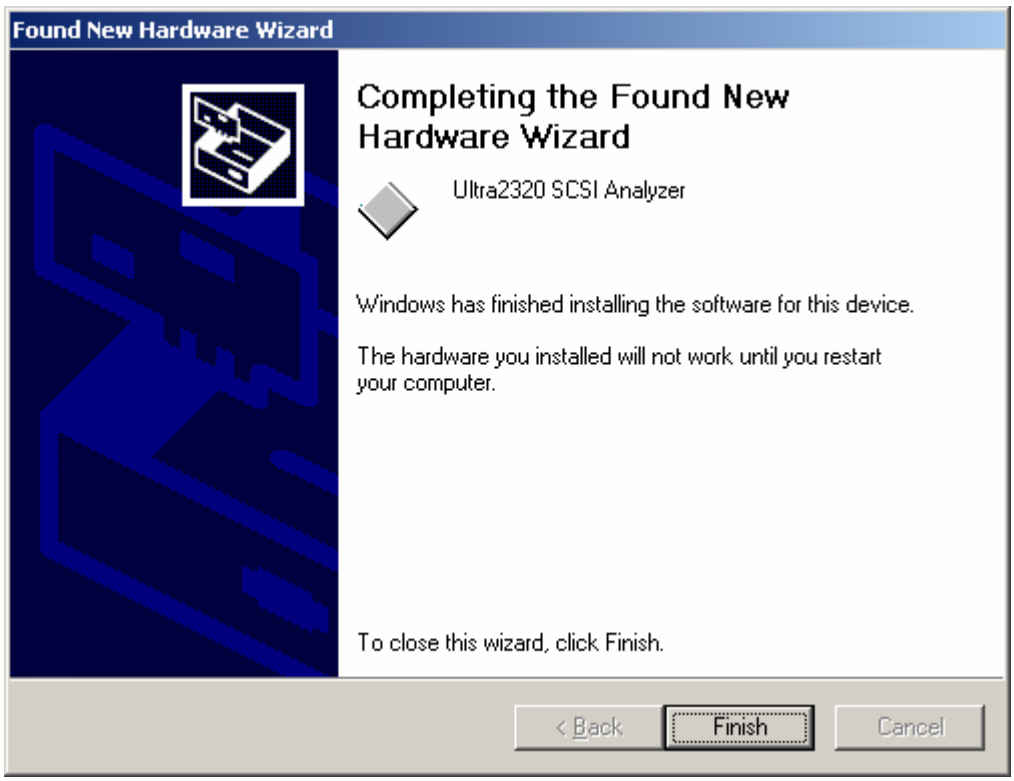
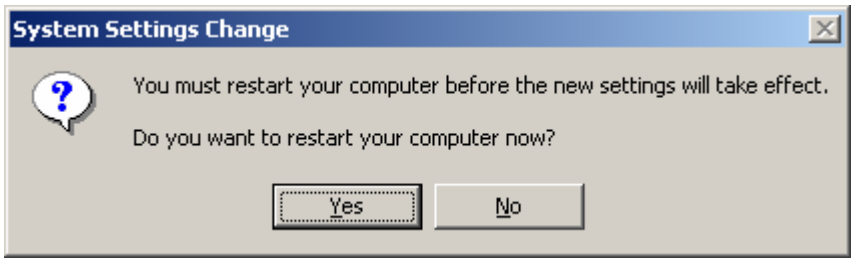

Found New Hardware Wizard
Completing the Found New Hardware Wizard
Ultra2320 SCSI Analyzer
Windows has finished installing the software for this device.
The hardware you installed will not work until you restart your computer.
To close this wizard, click Finish.
< Back
Finish
Cancel

Click "Finish" to continue.


System Settings Change
You must restart your computer before the new settings will take effect.
Do you want to restart your computer now?
Yes
No

Click "Yes" to restart.

You **must** now restart your computer.

The computer will now shutdown and the operating system will re-boot. After the computer completes its reboot you can now proceed to STEP 3 (*Ultra2320 Application software installation).*

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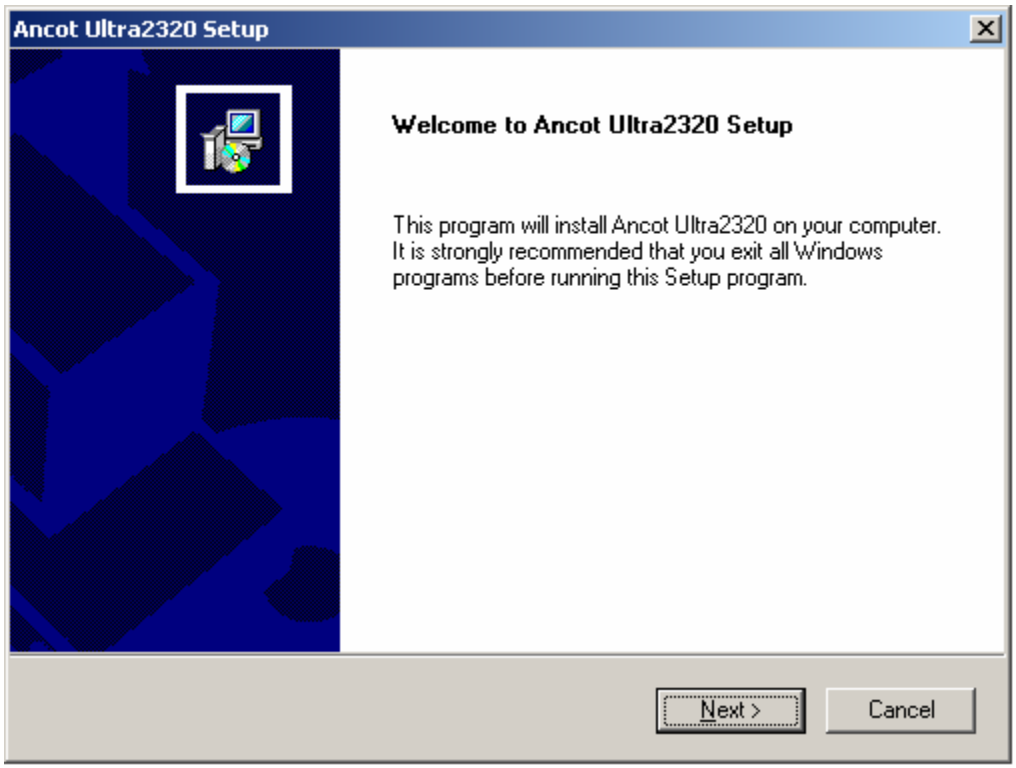
A.5 STEP 3: ULTRA2320 APPLICATION SOFTWARE INSTALLATION

After you have completed steps 1 and 2 you are now ready to install the U2320 Application software. Insert the supplied "Ultra2320 Software" CD into the computer.

Browse to the following file***…..D:\Ultra2320 Software\Setup.exe*** and click on it to start the installer.


Ancot Ultra2320 Setup
Welcome to Ancot Ultra2320 Setup
This program will install Ancot Ultra2320 on your computer.
It is strongly recommended that you exit all Windows programs before running this Setup program.
Next >
Cancel

Click next to continue. Follow the general screen prompts through the installation to completion. Restart the computer when installation has finished. The U2320 SCSI Analyzer is now ready for operation.

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